Order Number 9302643

An investigation of self-efficacy and control theory with elite distance runners

Martin, Jeffrey John, Ph.D.

The University of North Carolina at Greensboro, 1992

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

AN INVESTIGATION OF SELF-EFFICACY AND CONTROL THEORY WITH ELITE DISTANCE RUNNERS

by

Jeffrey J. Martin

A Dissertation Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
1992

Approved by

Diane L. Gill

Dissertation Adviser

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro.

Dissertation Advisor _____

Committee Members _____

_____

_____

July 9, 1992
Date of Acceptance by committee

June 4, 1992
Date of Final Oral Examination

MARTIN, JEFFREY J, Ph.D. AN INVESTIGATION OF SELF-EFFICACY AND CONTROL THEORY WITH ELITE DISTANCE RUNNERS. (1992). Directed by Dr. Diane L. Gill. pp. 124.

The purpose of the present study was to investigate the role of self-efficacy, outcome expectations, and private self-consciousness (PSC) in elite distance runners. Ninety-four male and female runners completed biographical, self-efficacy, outcome self-confidence, and private self-consciousness questionnaires before a ten kilometer race. Following the race runners completed performance questionnaires assessing their race time and place, and self-ratings of performance. Correlational analyses indicated that outcome expectations were related to time and private self-consciousness was positively associated with self-ratings of performance for females, but not male runners. Elite female distance runners higher in outcome self-confidence ran faster in their races than runners lower in outcome self-confidence. Runners high in PSC and with strong outcome expectations were more satisfied with their performance based on outcome than were runners lower in private self-consciousness. Similarly, runners with weak self-efficacy expectations and high in PSC, rated their performance based on time and outcome as better than runners lower in PSC. In addition, these same runners missed their time goals by less than runners lower in PSC. These findings provide no support for self-efficacy theory and are mixed in their support of control theory and the role of private self-consciousness.

ACKNOWLEDGEMENTS

I wish to express my thanks and respect to Dr. Diane L. Gill for her guidance, understanding, and confidence in me during my doctoral program and during this dissertation. I have also been fortunate to have had the opportunity to learn from Dr. Dan Gould, Dr. Jackie White, and Dr. Scott Hinkle during this study. I am equally fortunate to have had the support of many colleagues over the last four years and I would like to thank the ESS faculty and Ed, Betty, Sue, Steve, Bob, Chris, Laura, Liz, Paul, Nick, Suzy, and Al.

In particular I would like to acknowledge Don, Skip, Punch and John for their many years of guidance and laughter. More recently, I'm very grateful to Julie, Mitch, Nicole, and Victoria for their friendship, patience, and sense of humor during this past year. Finally, through it all I have been blessed with three wonderful and loving friends who I couldn't have done it without; my parents Ray and Vera, and Susan.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

The field of exercise and sport psychology has made significant advances in its short history (Landers, 1983). Nevertheless, scholars in the area are concerned about the profession. For instance, in 1979, Martens urged sport psychologists to conduct field studies and develop theories of sport with less reliance on laboratory settings and social psychological theories. Similarly, noting a decline in theory testing, Landers (1983) called for more theory testing and theory building. Using Platt's (1964) concept of strong inference, Landers urged investigators to test theories and, more importantly, to design studies that test rival hypotheses from more than one theory. Similar research perspectives have been advocated elsewhere as important to sports psychology and psychology in general (Feltz, 1987; Sechrest, 1976; Vealey, 1989).

Recent studies have tested a variety of theories from social and personality psychology including Bandura's (1977) self-efficacy theory, Fishbein and Ajzen's (1975) theory of reasoned action, Weiner's (1974) attribution theory, Harter's (1982) theory of perceived competence and Eccles et al.'s (1983) value-expectancy theory. However, for the most part, research has been sparse and other theories from social and personality psychology have yet to be studied.

One exception to this trend are a variety of studies which have offered support for Bandura's self-efficacy theory (Feltz, 1988b; Martin & Gill, 1991). However, with a few exceptions, no studies have compared self-efficacy theory and competing theories (Feltz, 1982; Dzewaltowski, 1989) or combined self-efficacy theory with complementary theories in order to provide fuller explanations of psychological phenomena (Deeter, 1989). Thus, while self-efficacy theory has continued to gain support, further consideration of relevant rival and/or complementary explanations of behavior are needed (Maddux & Stanley, 1986). Carver's (1977) control theory is a viable alternative, and possibly complementary, view to explaining important sport-related cognitions and behaviors, that has yet to receive attention from sport psychologists.

A number of important reasons exist as to why control theory and self-efficacy theory should complement each other and increase behavioral predictability in a sport setting. First, both theories are conceptually similar, but different in several significant ways. Control theory and self-efficacy theory are expectancy theories and expectancy theories have successfully predicted a variety of behaviors in sport. At the same time, there are distinct differences. Control theory emphasizes outcome expectancies whereas self-efficacy theory emphasizes self-efficacy judgments. According to Bandura, self-efficacy is "the conviction that one can successfully execute the behavior required to

produce the outcome." (1977, p.193) and outcome expectancies are a "person's estimate that a given behavior will lead to certain outcomes." (Bandura, 1977, p.193). Carver and Scheier define outcome expectancies as "the subjective probability that the desired outcome will be obtained." (1982, p.186). Clearly, self-efficacy and outcome expectancies are different. Self-efficacy theory maintains people's judgments of their abilities to perform particular tasks that produce valued outcomes predicts behavior, whereas control theory asserts behavior is influenced by outcome expectancies, the likelihood of a valued outcome occurring.

Bandura focuses on people's capabilities and, for the most part, discounts considerations of outcome because outcomes result from people's actions. In contrast, Carver's form of outcome expectancies incorporates judgments about personally controllable actions such as self-efficacy and less controllable factors such as environmental constraints or task difficulty. Thus, Carver maintains that outcome expectancies subsumes self-efficacy judgments.

Both theories claim behavior is self-regulated through the adoption of goals or standards. Generally speaking, "...behavior is thus modified based on the comparative information to achieve a close match between conception and action." according to Bandura (1990, p.323), or according to Carver and Scheier "...human behavior is similarly seen as a continual process of establishing goals-reference values or

standards-and altering present states as to correspond more closely to them..." (1984, p.130). The distinction is, however, that self-efficacy judgments are made in respect to ability goals whereas outcome judgments are made with respect to an outcome goal or standard.

A further distinction central to control theory, and this study, is that self-attention, directing attention to oneself, is an important antecedent of behavior. According to Wicklund any self-component, such as self-efficacy and outcome expectancies, needs to "...become the object of the person's attention before it comes to play a significant part in psychological functioning." (1972, p.187) and "...we must know whether the individual is sufficiently self-focused for these self-components to have their influence on behavior.." (1972, p.192).

Control theory conceptualizes self-attention in two ways. First, self-attention is seen as possessing both trait-like and state-like properties. State self-attention, is promoted in controlled labratory settings by using a mirror to prompt self-reflection. Trait self-attention is assessed with the Self Consciousness Scale. Second, control theory distinguishes between self-attention directed to the private aspects of oneself and the public aspects of oneself. The degree to which people chronically direct attention to the private aspects of themselves is private self-consciousness. People high in private self-consciousness are "particularly conscious of their own

thoughts, feelings, attitudes, motives, and behavioral tendencies." (Carver & Scheier, 1981a, p. 46). In contrast, individuals high in public self-consciousness are "aware of the publically displayed aspects of the self, the self as a social object that creates impacts on other people." (Carver & Scheier, 1981a, p.46). The present study is limited to examining the trait conception of self-attention. Furthermore, because this study is concerned with the cognitions of self-efficacy and outcome expectations, public self-consciousness is not relevant to this study. As a result, control theory predictions regarding public self-consciousness, usually pertaining to the influence of social situations, will not be tested.

Control theory asserts that private self-consciousness enhances favorable outcome expectancies by increasing task persistence because anticipated goal success is salient. In contrast, when outcome expectancies are negative, private self-consciousness quickens either task withdrawal in free choice activities or mental disengagement in forced choice activities. This occurs because goal attainment is both unlikely and salient. In sum, private self-consciousness intensifies outcome expectancies so that strong expectancies become stronger and weak expectancies become weaker. Outcome expectancies and private self-consciousness constitute the essential components of control theory. The inclusion of private self-consciousness, thought to make goals salient, in control theory and its absence in self-

efficacy theory highlights another conceptual difference in the two theories. The question of whether goals are always conscious is, however, unresolved (Pervin, 1989) and neither Bandura nor Carver directly addresses this issue.

In sum, Bandura (1977) has posited self-efficacy as a singular, unifying construct that mediates all thought and behavior. In contrast, Carver (1979) presents a theory in which the direction of thought (self-attention), and the content of thought (outcome expectancies) predict behavior.

Finally, self-efficacy theory is a social cognitive theory which addresses how social and cognitive factors influence self-efficacy judgments which, in turn, influence behavior choices, and behavioral persistence and effort. In contrast, control theory is a cognitive-attentional theory that emphasizes either the consequences of cognitive activity by looking at outcome expectancies and self-directed attention to the private aspects of oneself, the focus of the present study, or the consequences of both social and cognitive factors by examining outcome expectancies and self-directed attention to the public aspects of oneself. These conceptual similarities and differences represent the first reason why self-efficacy and control theory should be examined in conjunction.

Second, empirical work substantiates the validity of both theories. For example, laboratory research examining antecedents of both task persistence and behavioral intentions have substantiated the independent contributions

of self-attention, outcome expectancies, and self-efficacy in non-sport settings (Jacobs, Prentice-Dunn, & Rogers, 1984; Prentice-Dunn & Jacobs, 1986). As importantly, in sport and exercise settings, self-efficacy and outcome expectations have both predicted athletic performance (Barling & Abel, 1983; Feltz, 1988a; Martin & Gill, 1991) and exercise adherence (Desharnais, Bouillon, & Godin, 1986).

Third, control theory has a long history in which self-attention has predicted a wide variety of behaviors including aggression, fear, reactance, compliance, expectancies, affect, and attributions in non-sport settings (see Carver & Scheier, 1981a for review). These results have been found in both controlled laboratory studies where self-attention has been manipulated and in field studies where self-attention has been assessed as a personality disposition. Unfortunately, although control theory has demonstrated predictive validity rivaling self-efficacy theory, ecological validity in a sport setting is missing.

Fourth, with the exception of Nideffer's (1976) model of attentional style and Morgan and Pollock's (1977), and others, work on association/dissociation, no research examining the role of attentional processes has been conducted in exercise or sport psychology. Thus, research in this domain is lacking.

Fifth, a large amount of psychological research in sport has examined the role of cognitions, such as self-

efficacy, and affect, such as anxiety, on sport performance. In the opposite direction, research has looked at the influence of sport on cognitions such as attributional judgments and emotions like anger. However, control theory (Carver & Scheier, 1981a) suggests these various cognitions and emotions may only be knowable and reportable to the degree that people are aware of them. According to Fenigstein, Scheier, and Buss (1975), individuals low in self-attention may be willing, but unable to reveal inner thoughts and feelings. The importance of self-attention in human functioning is also seen in various therapeutic orientations that cite increased self-awareness as a major goal of therapy (Corey, 1986; 1990). Thus, there is a need to determine if self-attention is related to sport cognitions and this study is an initial step in that direction.

Finally, similarities between self-efficacy expectancies and outcome expectancies make it intuitively appealing to speculate that self-attention may accentuate strong self-efficacy expectations as well as favorable outcome expectations. In testing this hypothesis, Prentice-Dunn and Jacobs (1986) supported the facilitative effects of self-attention on both outcome and self-efficacy expectations. Therefore, this study will help assert if, in the interest of parsimony, researchers should be considering variables from both theories.

It has been suggested that private self-consciousness may be an antecedent of virtually all cognition and emotion, and this clearly has ramifications for personality and social psychological research. The inclusion and importance of private self-consciousness in control theory rests heavily on this rationale.

In conclusion, there is a need to determine if self-efficacy theory retains its strong predictive ability when tested in conjunction with a viable alternative theory, such as control theory. Additionally, it is important to assess if self-efficacy and control theory complement each other to enhance behavioral predictability. The purpose of the present study is to investigate if private self-consciousness enhances strong self-efficacy and outcome expectations in sport by using Carver's (1977) control theory and Bandura's (1982) self-efficacy theory.

To test both theories, it is necessary to sample athletes who possess both outcome expectations and self-efficacy judgments. Elite runners, because of their history of success, should have both time and outcome goals upon which to form self-efficacy and outcome expectations, respectively. In contrast, a less elite sample may not hold outcome expectations because outcome goals are unrealistic for them. Just as it is likely an elite sample of runners should hold both time and outcome goals, it is equally likely these goals are realistic (Vealey, 1986). Thus, these runners should have strong self-efficacy and outcome

expectations, which may prevent an analyses of control theory predictions for athletes with weak expectancies. Clearly, a paradox exists; less skilled athletes, who might possess weak expectancies, probably do not hold place related outcome goals, although they would likely have a variety of subjective outcome goals. Thus, an assessment of place related outcome expectations is impossible.

The present study is interested in whether elite runners with strong self-efficacy and outcome expectations, who are self-attentive, perform better than elite runners who, while also having favorable self-efficacy and outcome expectations, are less self-attentive. With this central question in mind the following hypotheses are offered.

HYPOTHESES

The present study is concerned with the role of self-attention in conjunction with outcome and self-efficacy judgments as they relate to performance in elite distance runners. For the purposes of this study, males and females who have run under 30 and 34:30 minutes for 10 kilometers respectively, are considered elite. It is assumed, given their ability and history of success, these elite distance runners will be "positive" (above 50 on a 100 point scale) on both self-efficacy and outcome expectations. Therefore, the present study will only test predictions made by self-efficacy and control theory that deal with favorable outcome and self-efficacy judgments. In the event that an adequate number (n=30) of runners do report weak outcome

expectancies, or self-efficacy judgments, (below 50 on a 100 point scale) correlations will test the hypothesis that a negative relationship exists between private self-consciousness and performance for this sub-sample. However, the following hypotheses are presented for athletes holding strong self-efficacy and outcome expectations. These hypotheses individually test predictions made by each theory and combine both theories to determine if they complement each other. Contingent on these hypotheses being supported, some exploratory questions comparing the theories are posited. Hierarchical regression analyses entering control theory variables after self-efficacy and vice versa will answer these questions by partitioning the variance accounted for in performance by each theory.

Consistent with predictions based on control theory, self-attention and outcome expectancies are hypothesized to predict performance. More specifically;

1) outcome expectancies will be positively associated with performance, and

2) self-attention will be positively correlated with performance.

Based on self-efficacy theory it is predicted that;

3) self-efficacy will be positively associated with performance.

EXPLORATORY QUESTIONS

An important part of this study is to determine whether self-efficacy or control theory does a better job of

predicting performance in elite distance runners. If the above hypotheses are supported, it is important to determine which theory is most useful. However, because little research in general, and no sport specific research has examined this issue this part of the study is considered exploratory. Thus, a series of exploratory questions, versus hypotheses, are presented. These questions are as follows;

1) Which variables, self-efficacy, outcome expectancies, or private self-consciousness, accounts for more of the variance in performance?

2) How much variance is accounted for by self-efficacy after outcome expectancies and private self-consciousness have been entered?

3) Similarly, how much variance is accounted for by outcome expectancies and private self-consciousness after self-efficacy has been entered?

Generally speaking, the standardized beta's and variance accounted for will determine which variables, and theory, accounts for the most variance in performance (see the Methodology section).

CHAPTER II

REVIEW OF LITERATURE

The first section of this chapter reviews control theory and related theoretical perspectives while emphasizing self-attentional processes and supporting research. Then self-efficacy theory and research, methodological issues, and criticisms of self-efficacy theory are reviewed. Finally, research that has combined self-efficacy and control theory, and work in sport psychology that is relevant to this study are discussed.

Control Theory

The framework for this study is Carver's (1979) cybernetic or control theory of self-attention because of its parallels to self-efficacy theory. Duval and Wicklund's (1972) theory of objective self-awareness and Powers (1973) work on control processes were both departure points for control theory (Carver & Scheier, 1981a). Carver and Scheier (1981) expanded Duval and Wicklund's (1972) concept of self-attention into self-attention directed towards private and public aspects of the self, and incorporated work by Powers (1973) to explain behavior from an information processing point of view. The theory is based on an information processing model in which information is perceived, acted upon, and outputs are generated. Contrary

to many social cognitive theories of self-regulation, attentional processes as well as cognitive activity are considered important.

Control theory describes cognitive activity as a series of negative feedback loops which regulate behavior through three functions. The negative feedback loop is also referred to as a TOTE (test, operate, test, exit) unit (see Figure 1). An example of one loop and the three functions is presented next. First, a condition is sensed. For example, during a 10 kilometer race a runner may go through the one mile mark in 4 minutes and 42 seconds and sense (hear) the timer indicate this. Second, this sensed state (4:42 pace) is compared against the reference state, value, standard, or goal. In this example the desired pace or reference state may be 4:35 for the first mile. A comparison is made between the sensed value (4:42) and the reference value (4:35). Third, the feedback loop senses this discrepancy and tries to reduce it. Thus, the runner tries to speed up. If, for example, the reference value or goal was 4:42 and the runner actually ran 4:42 then nothing is done and this process of test, operate, and test is exited. This is the main function of the negative feedback loop. Control theory asserts that outcome expectancies are the degree of certainity individuals possess in being able to achieve the reference value or goal. Outcome expectancies are important because the strength of the expectancy determines how much effort people expend in

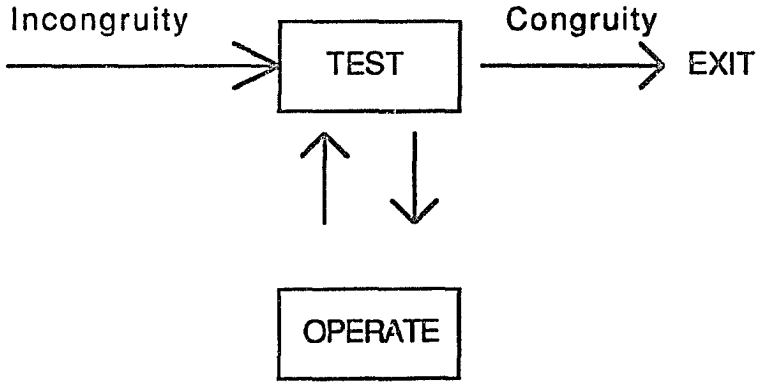


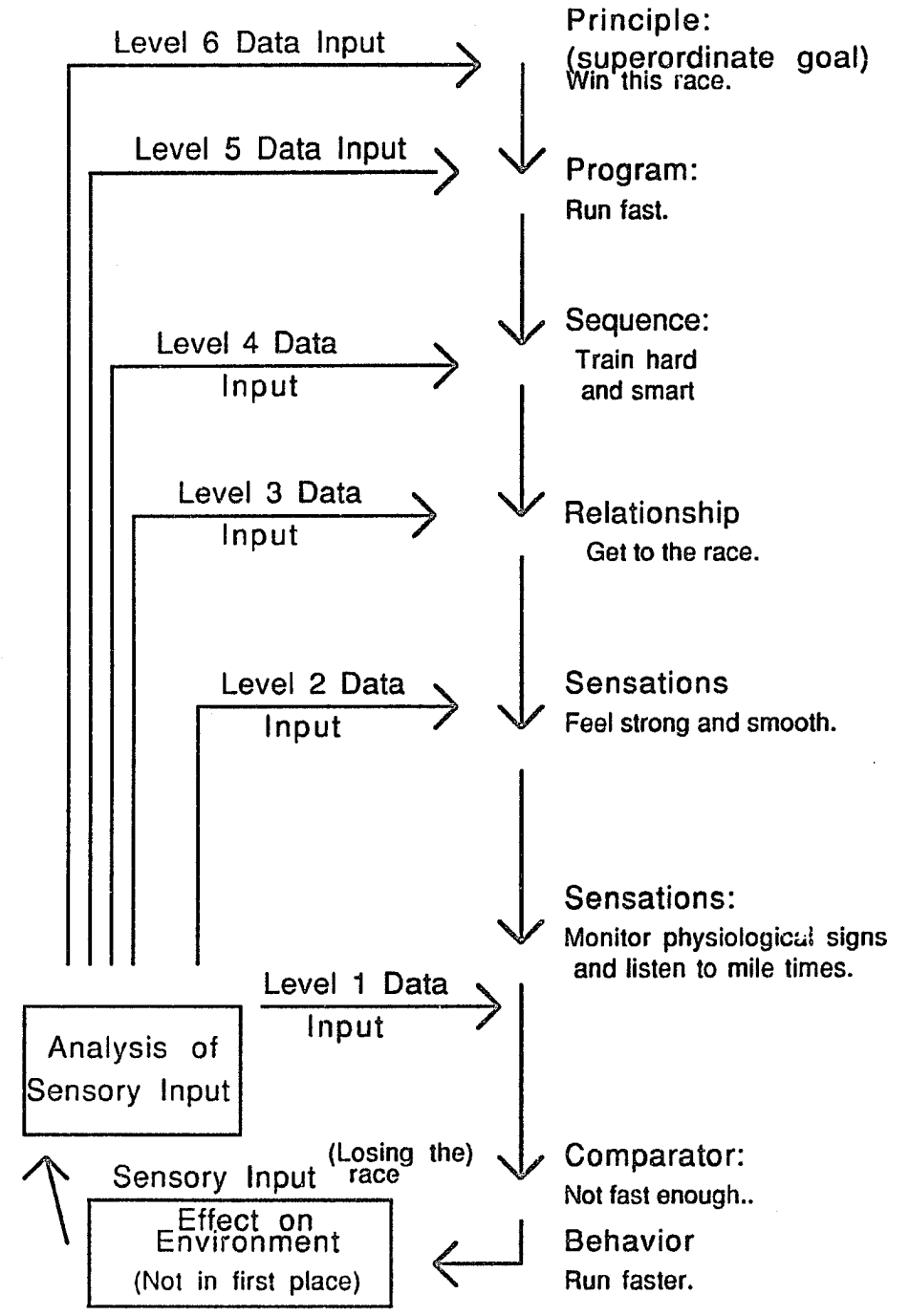
Figure 1

Control Theory Tote Model

trying to match their behavior to their goal. Individuals with stronger expectancies come closer to achieving their goals than individuals with weaker expectancies.

Furthermore, a hierarchy of negative feedback loops varying in their source of input exist. For instance, as Figure 2 indicates, a loop would exist for sensing physiological feedback such as respiration rate from the lungs and another loop for "feeling" smooth and fluid which would depend on input from kinesthetic senses. The top of the hierarchy consists of a negative feedback loop based on a superordinate goal which would be, for this race, achieving an overall outcome goal where input is cognitive in nature. This is the level of analysis with which this study is concerned.

With respect to attentional processes, control theory asserts that the degree of input from cognitive sources is dependent on attentional direction. The more one attends to the source of input, such as goal-related cognitive activity, the greater the influence outcome expectancies will have on behavior. Recall that self-attention is a generic term referring to both private and public self-consciousness, a stable disposition to direct attention inwards or outwards, respectively. Self-awareness refers to a state-like condition, influenced by both dispositional and environmental influences (Fenigsten, Scheier, & Buss, 1975). Self-awareness is further broken down into self-focus, which is attention directed inwards to one's thoughts, feelings or



HIERARCHY OF GOALS/STANDARDS

Figure 2

motives. In brief, as figure 3 illustrates, state and trait influences direct attention internally or externally towards standards of behavior or goals which people then form strong or weak expectancies towards. Laboratory studies have typically manipulated self-focus by placing a mirror before subjects and discounting it as irrelevant to the experiment. The mirror is assumed to promote self-focus because subjects see themselves and are prompted to examine their thoughts, feelings, and motives. Environmental focus is attention directed outwards (Carver, 1979).

The present study is a field experiment and, as a result, does not allow the manipulation of a state-like condition like self-focus. Thus, self-attention must be assessed by examining private self-consciousness, the disposition to direct attention to one's thoughts, feelings, goals, and motives. This study is specifically concerned with attention directed inwards to self-efficacy and outcome expectations. Field work examining individual differences in self-consciousness has used the Self-Consciousness Scale (SCS) developed by Fenigsten, Scheier, and Buss (1975) and the Self-Consciousness Scale Revised (SCSR) by Scheier and Carver (1985). Three subscales assess private self-consciousness, public self-consciousness, and social anxiety. Conceptually, private and public self-consciousness occupy separate continua. As a result, individuals rate high or low on either aspect of

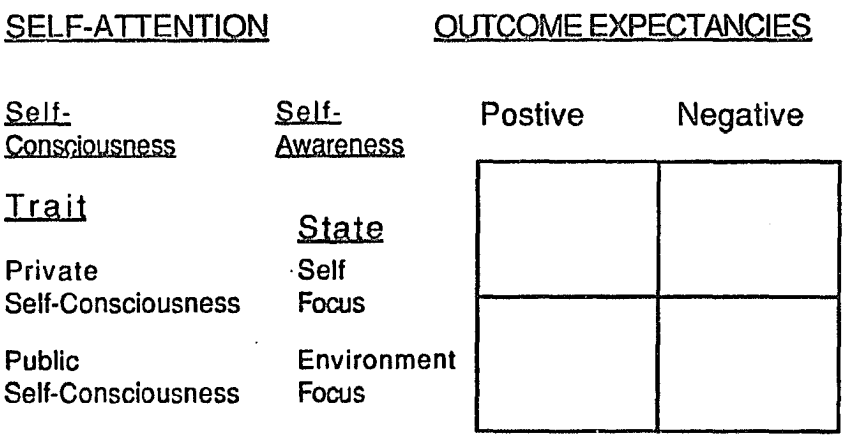


Figure 3

Control Theory Components

consciousness although they tend to be positively, but weakly, correlated (Carver & Scheier, 1981a).

Carver and Scheier's (1981a) conceptualization also differentiates self-attention from self-monitoring, which is how responsive people are to social influences (Snyder, 1979, 1987). Low (Turner, Scheier, Carver, & Ickes, 1978) to moderate (Tomarelli & Shaffer, 1985) correlations between self-monitoring and self-attention scales also substantiate their differences.

Research on private and public self-consciousness has been criticized (Golliwitzer & Wicklund, 1987; Wicklund & Golliwitzer, 1987) as being atheoretical, failing to consider alternate explanations, and reductionistic. In short, Wicklund and Golliwitzer do not believe attention can be reduced to a private self and a public self. Nonetheless, Carver and Scheier (1987) and Fenigstein (1987) offer convincing arguments and evidence for the validity of the dispositional constructs of private and public self-consciousness. Likewise, Leary and Kowalski (1990) support such a distinction and recommend labels of private-self awareness and public-self awareness to more fully distinguish the meanings of these terms.

Self-consciousness is moderately related to identity theory. Cheek and Briggs (1982) found private self-consciousness was related to personal identity and public self-consciousness was associated with social identity. The authors attributed these relationships to questionnaire

items asking about similiar aspects of self. However, they suggest the moderate correlations result from theoretical distinctions between self-consciousness, which refers to the direction of attention, and the identity scale which assesses what aspects of identity are important.

In an attempt to broaden their understanding of self-consciousness, Schlenker and Weigold (1990) investigated self-consciousness from a self-presentation perspective. According to Carver and Scheier (1984) individuals low in public self-consciousness and high in private self-consciousness tune out the external environment, which Schlenker and Weigold (1990) refer to as the "social obliviousness hypothesis." This view suggests high private self-conscious and low public self-conscious individuals are not easily influenced by social norms. In contrast, their "autonomous identity hypothesis" predicts that high self-conscious people attempt to socially construct, versus actually hold, an independent identity. Their results indicate support for an autonomous identity hypothesis suggesting the private versus public self-consciousness distinction not only refers to the object and direction of attention but also to self-identification processes. In brief, the authors suggest that high private self-conscious individuals attempt to create identities emphasizing individuality and "appearing autonomous", even if they sacrifice "being autonomous" whereas high public self-conscious people try to create identities which exemplify

cooperation and dependence. In conclusion, Schlenker and Weigold (1990) further our understanding of the potential implications resulting from the direction of our attention.

In addition to self-presentation, self-monitoring, self-awareness theory, and identity theory, an arousal explanation has also been offered to explain results attributed to control theory and attentional processes. In brief, it is suggested that heightened arousal induced by mirrors or cameras directs attention to behavioral standards or affect. However, research has shown self-focus increases the recognition of the absence of affect as well as the presence of affect. Furthermore, results of studies examining mirror-induced self-focus parallel results using private self-consciousness where private self-consciousness is shown to be unrelated to social anxiety, emotionality, and arousability. In contrast, Wegner and Guiliano (1983) support exercise-induced arousal as an antecedent of self-focus. In conclusion, self-focus is probably induced by a multitude of antecedents. In addition to mirrors, cameras, and physical arousal, negative affect (Wood, Saltzberg, & Goldsant, 1990), and completing multiple self-report scales (Osberg, 1985) also have been cited as antecedents of self-focus. Thus, arousal may be one antecedent of self-focus but there is no support to suggest replacing a self-attention explanation with an arousal explanation.

Control Theory Research

Control theory predicts people self-regulate behavior by pursuing goals or attempting to match behavior to standards and that self-attention aids this process by making the goal or standard salient. A variety of studies, have supported this hypothesis. It is important to recall that self-focus refers to an induced, or manipulated, "state" of self-attention and self-consciousness refers to a "trait-like" measure used to assess subjects chronic levels of self-attention.

Burgio, Merluzzi, and Pryor (1990) found self-focus interacted with outcome expectancies of being able to successfully communicate with people to predict social performance. Outcome expectancies of social performance predicted social skill for self-focused subjects whereas outcome expectancies failed to predict social skills for non self-focused subjects. Scheier, Fenigsten, and Buss (1974) found aggression was inhibited in self-focused subjects who believed the standard of behavior to achieve was non-aggression. In contrast, Carver (1974) noted increased aggressive behavior in high self-focused subjects who were led to believe the aspired to standard of behavior was aggression. Thus, heightened self-focus both increased and decreased aggressive behavior depending on whether aggressive or non-aggressive behavior was adopted as the behavior standard.

Later research has found self-focus and expectancies may not predict persistence when affect is strong. Scheier, Carver, and Gibbons (1981) found fear overrides the pursuit of adopted goals. Individuals who were high in self-focus and high in private self-consciousness were more aware of fearful affect than subjects low in these constructs and thus withdrew faster and more often from approaching a snake, the desired standard of behavior.

Self-attention has also been implicated in the process of psychological reactance, a motivational state evoked by the threat or loss of freedom. Carver and Scheier (1981b) found both self-focus and private self-consciousness mediated the occurrence of reactance. Subjects high in PSC were more responsive to threats to their freedom than subjects low in PSC. In other words, individuals low in self-attention seem to lack insight into thoughts and feelings that precede the formation of reactance. Furthermore, high private self-consciousness was necessary when the information source inducing reactance was internal and high public self-consciousness was important when the reactance was induced via an external social stimulus.

Froming and Carver (1981) have shown self-consciousness mediates compliance. Individuals high in private self-consciousness resisted complying to group pressure while those high in public self-consciousness acquiesced to high, but not low, group pressure. Thus, in a compliance paradigm the implication is high private self-conscious subjects

match their behavior to internal standards while subjects high in public self-consciousness adopt the group's standard.

These results suggest self-consciousness may play a role in the attitude-behavior relationship. In testing this premise Scheier (1980) assessed subject's attitudes towards punishment. Then, two weeks later they wrote essays describing their attitudes on punishment under the pretext of discussing their essays with disagreeing peers. Correlations between both indices of attitude were only significant for subjects scoring both high in private self-consciousness and low in public self-consciousness. Carver and Scheier (1981a) suggest that subjects high in private self-consciousness and low in public self-consciousness have developed attitudes based on frequent introspection. They then match behavior to these internal standards and, at the same time, are not aware of and do not attempt to match publicly held standards of behavior. This combination of high private and low public consciousness results in high attitude consistency. Scheier, Buss, and Buss (1978) supported these results by finding moderate correlations between self-report and actual behavior for subjects high in private self-consciousness and low correlations for individuals low in private self-consciousness.

It has also been shown that self-focus enhances the salience of affect as well as behavioral standards or goals (Scheier & Carver, 1977). Four experiments, using both

manipulated self-focus and dispositional private self-consciousness, examined the relationships between self-awareness and affective reactions to attractive and repulsive stimuli and affective reports to the induced affective states of elation, and depression. In general, strong support emerged for all hypotheses. Subjects high in either self-focus or private self-consciousness reported greater intensity or experience of affect than subjects who were less self-aware. For example, high self-aware subjects reported greater elation and greater depression in response to positive or negative mood inductions than less self-aware subjects, respectively.

In conclusion, extensive research in personality and social psychology has clearly supported control theory and the viability of self-attention as an important antecedent of behavior. Other research, reported later (see the Self-Efficacy and Control Theory section), has not been as supportive. Unfortunately, little field research, particularly in sport, has been conducted.

Self-Efficacy Theory

Overview

Self-efficacy theory stems from social cognitive theory, an outgrowth of social learning theory. Traditional social learning theory has ties to the behaviorist perspective and has only loosely endorsed an interactionist approach to behavior (Maddi, 1989; Sahakian, 1982).

Although self-efficacy theory was subsumed under social learning theory in early writings (Bandura, 1977), later writings include self-efficacy theory under social-cognitive theory, which Bandura (1986) describes as more accurately representing the influences of both internal and external forces. In presenting social cognitive theory Bandura states, "...human functioning is explained in terms of a model of triadic reciprocality in which behavior, cognitive, and other personal factors, and environmental events all operate as interacting determinants of each other." (1986, p. 18). Bandura further states "Among the types of thoughts that affect action, none is more central or pervasive than people's judgments of their capabilities to deal effectively with different realities." (1986, p. 21), in other words, self-efficacy judgments.

Self-efficacy is a cognitive and situation-specific measure of self-confidence. Specifically, it is "the conviction that one can successfully execute the behavior required to produce the outcome" (Bandura, 1977, p. 193). However, Bandura later defines self-efficacy as "peoples judgments of their capabilities to organize and execute courses of actions required to attain designated types of performances." (Bandura, 1986, p. 391). In contrast, outcome expectancies are a "person's estimate that a given behavior will lead to certain outcomes." (Bandura, 1977, p. 193). Because outcome expectations do not address whether a person believes they can execute the required behavior

Bandura does not consider them as important as self-efficacy expectations. In cases where outcomes are not contingent on personal capabilites Bandura has acknowledged their importance. The value of self-efficacy lies in the comprehensive theory Bandura has developed.

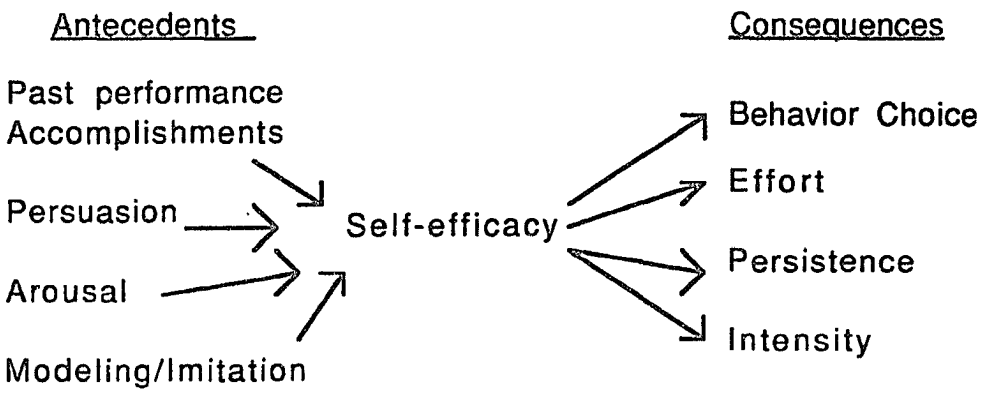
It is important to remember self-efficacy is a cognitive construct and theory, and subsequent research has generated and discussed a wide range of hypotheses. As illustrated by Figure 4, various antecedents, consequences, and associated states of self-efficacy have been examined by looking at behavioral indices, cognitive constructs, and affective states and these areas will be examined next.

Consequences of Self-Efficacy

Self-efficacy is hypothesized to predict performance given the necessary physical ability and motivation to perform are present. Moreover, self-efficacy has been shown to be an important mediator of behavior, independent of ability or motivation (Schunk, 1984). According to Bandura (1986), "People who regard themselves as highly efficacious act, think, and feel differently from those who perceive themselves as inefficacious. They produce their own future, rather than simply foretell it." (p. 395). Bandura believes self-efficacy influences behavior initiation, effort expended and persistence (Bandura, 1986).

People constantly decide to engage in certain behaviors and as Bandura (1990) notes, "A capability is only as good as its execution." (p. 315). Perceptions of self-efficacy

Self-Efficacy Theory



Control Theory

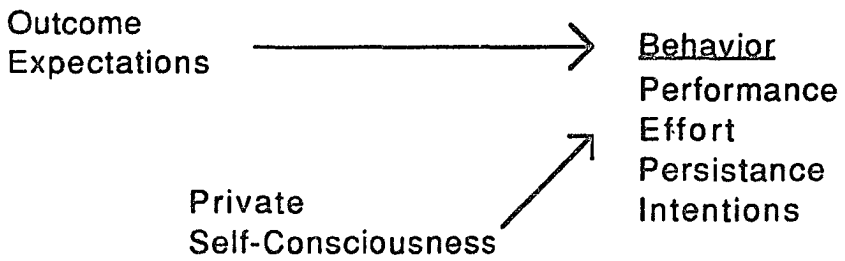


Figure 4

A Comparison of Self-Efficacy and Control Theory

determine, to a large degree, behaviors people choose to undertake. Individuals avoid tasks they believe are beyond their capabilities and readily attempt activities they feel competent in. Clearly, the ability to accurately judge self-efficacy is important. Overestimating self-efficacy may contribute to failure while underestimating self-efficacy may prevent behavior choices with potential for success. However, individuals who slightly overestimate their self-efficacy are the ones who expand the boundaries of human limitations (Bandura, 1986). People persist longer and spend more energy at a task if they are self-efficacious. In contrast, people low in self-efficacy give up sooner and spend less energy if their efforts are met with failure. Thus, people who persevere longer may enjoy a greater probability of success and enhanced self-efficacy (Feltz, 1986). On the other hand, self-inefficacious individuals who give-up readily may reinforce their low self-efficacy by failure experiences.

Associated States of Self-Efficacy

Self-efficacy is important for other, less direct reasons because it is associated with different cognitive and affective states. For example, individuals who possess a strong sense of self-efficacy approach problems more analytically than those with a weaker sense of self-efficacy (Bandura & Wood, 1989; Wood & Bandura, 1989). Pain tolerance for a cold-pressor was greatest when subjects possessed high levels of both perceived self-efficacy and

perceived control (Litt, 1988). Individuals with strong percepts of self-efficacy also visually image successful athletic performance to a greater degree than athletes who are less efficacious (Feltz & Landers, 1983).

Although self-efficacy theory doesn't address emotional states or processes a great deal, Bandura frequently discusses anxiety. According to Bandura (1990) anxiety is a response to perceived threat. In turn, threat results from a perception that one's resources are not adequate to meet the demands of the situation. In other words, people have a weak sense of self-efficacy regarding the task at hand. Furthermore, the sense of anxiety brought on by threat and low self-efficacy is intensified by perceptions of poor coping self-efficacy, an inability to successfully control feelings of anxiety (Kent & Gibbons, 1987).

Although Bandura (1990) asserts self-esteem is not correlated with self-efficacy he concedes people develop abilities in areas that provide a sense of self-esteem. Furthermore, judgments of self-efficacy do generalize to similar tasks (Brody, Hatfield, & Spalding, 1988) suggesting individuals who experience a strong sense of self-efficacy across various domains may also enjoy a healthy sense of self-esteem. This should not be surprising as self-efficacy and self-esteem share similar antecedents, although the precursors of self-esteem go beyond assessments of competency (Bandura, 1986; Harter, 1990). Self-efficacy is also associated with mood states, a less global index of

well-being. Subjects experiencing sad and happy moods via recollections of romantic failure or success also reported decreased or increased self-efficacy for potential romantic, social, and athletic encounters (Kavanagh & Bower, 1985). The authors speculated that sad moods reduce efficacy, happy moods inflate efficacy, or that a combination of both explanations are warranted. Thus, affective processes may not only parallel self-efficacy processes but they may also be important, and relatively neglected antecedents of self-efficacy.

Antecedents of Self-Efficacy

Bandura cites four powerful precursors of efficacy (see Figure 4), the most powerful being previous performance accomplishments. Successfully perceived performances enhance self-efficacy while failure experiences lower efficacy levels. Previous experience affects current self-efficacy which in turn affects future performance and a cyclical pattern develops (Feltz, 1982; Feltz & Mugno, 1983). Early success in a sport influences self-efficacy more than success achieved later in the sport and success in one sport generalizes to success on similar other sports through the common mediating mechanism of self-efficacy (Bandura, Adams, Hardy, & Howells, 1980; Brody, Hatfield, & Spalding, 1988). Also, success or failure in mastering difficult skills tends to have greater self-efficacy effects. Independent success or failure experiences carry more weight than attempts in which help has been rendered.

Skilled coaches specifically structure practice and competitive situations in order to build self-efficacy (Bandura, 1990). Coaches also verbally attempt to persuade athletes of their competence and this is a second antecedent of self-efficacy. Of particular importance is the credibility and trustworthiness of a coach or teammate. If for instance, a coach is highly credible and perceived as trustworthy then the persuasive communication can be very effective. Bandura also cites vicarious experiences, such as modelling effects, as mediators of self-efficacy. An athlete with limited experience in an event may use others as a gauge of their own abilites. Models with similar personal characteristics have greater influence on self-efficacy. The rationale, displayed as self-talk is as follows, "If he/she can do it, then so can I."

Finally, assessments of bodily states influence self-efficacy. Specifically, if athletes interpret arousal as benefical competitive excitement, self-efficacy can increase. On the other hand, interpreting arousal as anxiety or fear can have negative consequences (Orlick, 1986). For runners, reduced feelings of perceived effort, experienced over a season, for comparable workout times can lead to increased self-efficacy. Or in the opposite direction, running faster practice times, over a competitive season, with comparable feelings of perceived effort, can also lead to stronger race self-efficacy assessments. Both non-sport and sport research have strongly supported self-

efficacy theory as the next two sections indicate.

General Research

Self-efficacy theory has been applied in a variety of areas such as psychology, health, education, medicine, geriatrics and the work place, in addition to sport and exercise settings. For example, in health and medicine self-efficacy has predicted smoking relapses and the time to relapse (Collette, Supnick, & Payne, 1985), pain tolerance (Reese, 1982), exercise adherence (Desharnais, Bouillon, & Godin, 1986), personal empowerment in response to physical threat (Ozer & Bandura, 1990), psychological adjustment to abortion (Major, Cozzarelli, Sciacchitano, Cooper, Testa, and Mueller (1990), immune system responses (Wiedenfeld, O'Leary, Bandura, Brown, Levine, & Raska, 1990), weight loss and weight maintenance (Chambliss & Murray, 1979) and, coronary artery disease (Ewart, Stewart, Gillilan, & Kelemen, 1986). In education, Schunk (1984) states "educational practices differ in how they influence student's efficacy judgments." (p. 49). Schunk (1984) has found that, regardless of educational treatment, higher levels of self-efficacy were positively associated with higher levels of performance and persistence behavior. Finally, self-efficacy has also predicted career choice (Hackett & Betz, 1981) and psychosocial competence in the elderly (Abler & Fretz, 1988). While these results have shown strong support for self-efficacy, the following research in sport settings is most relevant to this project.

Sport Related Research

A variety of studies in sport psychology have tested various hypotheses generated from self-efficacy theory. More specifically, studies examining the self-efficacy-performance relationship have been most frequent. Using path analysis techniques Feltz (1982) and Feltz and Mugno (1983) tested female college students on back diving performance. In both cases, self-efficacy was statistically shown to be a causal agent of performance. However, although self-efficacy was the most significant predictor of performance on the first trial, its reliability as a predictor decreased with successive trials. Feltz and Mugno (1983) found performance on the previous trial was the best predictor of performance on the succeeding trial. Most importantly though, support was demonstrated for the reciprocal influence of self-efficacy and past performance. Furthermore, research examining males with Feltz's respecified model, which included self-efficacy, heart rate, past performance and autonomic perceptions, (1982) substantiated the role of self-efficacy as a predictor of performance in a high avoidance task (Feltz, 1988b).

Studies have also provided correlational support for the performance-self-efficacy relationship among marathoners (Gayton, Matthews, & Burchstead, 1986), long distance runners (Okwumabua, 1986), high school middle distance runners (Martin & Gill, 1991), cyclists (Duncan & McAuley, 1987), gymnasts (Lee, 1982; McAuley, 1985; Weiss, Wiese, &

Klint, 1989), basketball players (Miller & McAuley, 1987), hockey players (Lee, 1989), and tennis players (Barling & Abel, 1983).

Other studies have gone beyond the self-efficacy-performance relationship to substantiate other hypotheses generated from self-efficacy theory. For example, the work of Feltz (1982) and Feltz and Mugno (1983) found self-efficacy theory to be a superior and more parsimonious explanation of performance than an explanation based on an anxiety model. Feltz, Landers, and Raeder (1979) examined the effects of various modeling protocols on self-efficacy of subjects performing a back dive. Results, consistent with self-efficacy theory, indicated that a participant-modeling treatment resulted in increased efficacy and better performance than either a live or video-taped modeling treatment. Feltz and Riessinger (1990) have also substantiated the role of imagery and performance feedback as important antecedents of self-efficacy in a muscular endurance task. As evidenced, a wide variety of research in sport and exercise have supported self-efficacy as an important antecedent of sport performance, and past performance accomplishments, arousal, and modeling as important antecedents of self-efficacy.

One of the reasons so many predictions from self-efficacy theory have been examined is because Bandura (1977) has stipulated an exact methodology, referred to as a microanalytic research strategy, for testing self-efficacy

theory. In addition, some criticisms of self-efficacy theory are directed at this strategy. The next two sections examine these two issues.

Self-Efficacy Measurement

Bandura refers to his operational definition as a "microanalytical approach". This approach involves examining the strength, level, and generalizability of self-efficacy. Level refers to a hierarchy of tasks, usually ordered according to difficulty, which people believe they can perform. Within each level individuals' perceptions of self-efficacy may vary. This degree of certainty, for each level, is self-efficacy strength. Lastly, generality is indicative of the various domains. In athletics generality may refer to different sports at a macro level, and different tasks within one sport at the micro level.

Given these distinctions, Bandura's measurement of self-efficacy is developed by constructing a hierarchy of tasks that vary in their difficulty. Individuals indicate their strength of self-efficacy for each level by answering on a continuum ranging from extreme uncertainty to total certainty. A scale from 0 to 100% is typically used to quantify their responses to the various questions. Finally, the total self-efficacy score is obtained by adding strength scores for each question and dividing by the number of questions, or levels. Bandura believes this allows a measurement of self-efficacy for a discrete and limited task such as "how fast can you run ten kilometers on this course

on this given day at this particular time." Athletes making self-efficacy judgments must then consider such varied factors as course difficulty, weather conditions, current fitness level, motivation to perform, goal importance, etc. Construction of the assessment instrument requires the researcher to accurately divide a task up into discrete items that have relevance to the athlete and the task (Bandura, Reese, & Adams, 1982).

Criticisms of Self-Efficacy Theory

The impact of self-efficacy theory was first evident when the complete issue of Advances in Behavior Research and Therapy (1978) was devoted to self-efficacy theory. In addition, subsequent articles have pointed out potential shortcomings. Kazdin (1978) praises self-efficacy theory because it provides theoretical propositions and a methodology for testing the propositions. Although Kazdin sees a need for explaining the role of ability and motivation in conjunction with self-efficacy, he acknowledges the difficulty of assessing these two constructs while independently assessing self-efficacy. He recommends examining the interaction of self-efficacy with various degrees of skill and incentive.

Methodologically, Kazdin asserts the temporal proximity of self-efficacy measurement to performance measures and the high degree of similarity between self-report items and behavioral tests ensures high correlations. In response, Bandura states that the "similarity in the context of

efficacy judgment and action is not a limitation but a requirement for meaningful analyses of the relationship between self-referent thought and action." (Bandura, 1978, p. 246). Furthermore, Bandura asserts that if judgments and performances are measured too far apart new experiences may alter efficacy expectations.

Eysenck (1978) views self-efficacy as a "re-evocation of level of aspiration theories." (p. 174). Eysenck also asserts that Bandura ".... translates the major features of my own theory of neurosis and behavioral change into mentalistic (cognitive) language" (p. 172). In essence, Eysenck asserts that behavioral change is mediated by conditioned responses. Under certain conditions, a positive feedback cycle emerges whereby previous unconditioned stimuli become conditioned stimuli through their association with the conditioned stimuli and subsequent reinforcements. They then develop the ability to evoke a conditioned response. This cycle, according to Eysenck, is simply re-labelled "efficacy expectations" by Bandura.

For Bandura, performance and anxiety levels are both the result of efficacy expectations. In contrast, Eysenck maintains anxiety levels determine self-efficacy expectations and performance. However, Bandura (1986) and Feltz (1988) have indicated the relationship between anxiety and performance is essentially nil when self-efficacy is removed from the causal chain. In summary, research has

substantiated the role of self-efficacy while, at the same time, refuted the major criticisms of self-efficacy theory.

Self-Efficacy and Control Theory Research

The preceding literature review independently examined, and strongly supported both self-efficacy and control theory. However, research examining both theories and sport related research is most relevant to the current study. Both Jacobs, Prentice-Dunn, and Rogers (1984) and Prentice-Dunn and Jacobs (1986) examined self-efficacy, outcome expectations, and self-attention and these studies will be discussed in detail.

Jacobs et al. found, contrary to control theory, subjects low in self-focus with strong outcome expectancies regarding their ability to solve difficult anagram and geometric figure puzzles, persisted longer than high self-focus subjects with strong outcome expectancies. Their explanation, consistent with control theory, suggests an initial failure condition, designed to induce unfavorable self-efficacy, resulted in high self-focused subjects feeling intense negative affect which negated the formation of outcome expectancies for a second task. In contrast, subjects low in self-focus didn't experience negative affect and formed outcome expectancies. The same study found high self-focus did not increase persistence under high self-efficacy conditions or decrease persistence when self-efficacy was low. Self-focus did interact with outcome expectancies although their combined predictive power was

substantially less than self-efficacy. In conclusion, the author's suggested self-focus is important as it may influence affect in situations which can provoke strong emotion, in turn this affect may predict persistence by overriding or combining with both self-efficacy and outcome expectancies. Carver and Scheier (1981a) support this explanation by noting that strong negative affect may also become salient due to high self-focus and cause mental and/or physical disengagement from the desired goal. Finally, the authors support an integrated model that heavily weighs self-efficacy, retains outcome expectations, and stresses self-focus in potentially emotional laden situations.

Prentice-Dunn et al. (1986) used a factorial design to examine the ability of self-efficacy, outcome expectancies, and self-attention to predict behavioral intention to persist using assertiveness communication techniques in social settings. A triple interaction indicated that under conditions of high self-awareness, subjects with high outcome expectations and high self-efficacy had greater intentions to persist than did subjects with high outcome expectations and low self-efficacy. Furthermore two main effects, for outcome expectancies and self-efficacy, revealed the importance of both of these variables. Overall, the findings contribute strong support for self-efficacy theory. In conclusion, the authors urged continued

research examining the relationships among self-efficacy, self-awareness, and outcome expectations.

Finally, research by Hollenbeck and Williams (1987) showed subjects with high goal levels and high self-consciousness performed better than subjects with equally high goal levels but lower levels of self-consciousness. In conclusion, these results support the usefulness of self-efficacy and outcome expectations, but are equivocal in their support of self-attention. However, experiential knowledge and sport research have suggested the importance of self-efficacy, outcome expectations, and self-attention in an athletic setting.

The independence of self-efficacy expectations and outcome expectations has been vigorously debated (Bandura, 1984; Eastman & Marziller, 1984; Kazdin, 1978; Marziller & Eastman, 1984; Poser, 1978; Teasdale; 1978). As defined previously, self-efficacy "is the conviction that one can successfully execute the behavior required to produce the outcome." (Bandura, 1977; p. 133). Self-efficacy and outcome expectations are only relevant if they are linked in this way. From this definition, it is logical to expect a relationship between a behavior and the outcome stemming from it. Thus, a similar relationship should exist between self-efficacy expectations and outcome expectations. However, research is equivocal as relationships have been substantiated in some situations (Manning & Wright, 1983) but not in others (Barling & Abel, 1983; Maddux, Norton, &

Stoltenberg, 1986). In cases where self-efficacy and outcome expectations were related (Lee, 1984a; 1984b; Manning & Wright, 1983), Maddux et al. (1986) have suggested that outcome expectations have been poorly defined, and/or operationalized, thus confounding their assessment with self-efficacy. Both Maddux et al. (1986) and Manning and Wright (1983) urge care in defining and operationalizing both self-efficacy and outcome expectations. Clearly there is empirical and logical support for suggesting some degree of independence between self-efficacy and outcome expectations in some non-sport settings. There are also reasons to expect a moderate relationship between self-efficacy and outcome expectations in distance running due to the competitive structure of the sport.

The Competitive Race Setting

Athletic ability and outcome enjoy a unique relationship in distance running. For example, in looking at one particular race, the faster an athlete runs the higher he/she will usually place. Clearly, athletes need to possess some minimal level of expertise in order to win or place highly. However, personal abilities are often insufficient and athletes frequently go unrewarded when facing superior competition. For instance, a time of 30 minutes may win a local 10 kilometer race whereas the same time may not place in the top 20 of a national championship race. Thus, in most cases, ability and perceptions of self-

efficacy are necessary but not sufficient for an athlete to win. Highly skilled athletes often lose.

In addition to the competitive structure, athletic experience and the size of the competitive field may also determine whether self-efficacy, outcome expectancies, or both, predict performance. Recent research with high school distance runners (Martin & Gill, 1991) found, contrary to self-efficacy theory, that outcome expectations, judgments of placing in the race, not self-efficacy, predicted time and place. Martin and Gill (1991) speculated that inexperienced athletes in our sample, racing against small and familiar competitive fields, were able to easily formulate outcome expectations and, at the same time, their inexperience hindered them from accurately assessing their own performance self-efficacy. These results suggest that experienced athletes facing large competitive fields should give greater weight to self-efficacy judgments. However, most elite runners are familiar with the competition, and this knowledge serves to reduce large competitive fields to smaller fields, thus shifting judgments back towards a reliance on outcome expectations.

Elite athletes, the population of interest in this study, usually have the opportunity to achieve personal time goals and outcome goals. Prize money, merchandise, trophies, and public attention may cause elite runners to focus on the outcome and outcome expectancies. On the other hand, elite runners usually try to achieve time goals, such

as personal bests, suggesting self-efficacy expectations are important. As a result, perceptions of self-efficacy and outcome expectations should both predict performance in road racing, although it is expected that they will be moderately correlated.

There is also evidence to suggest athletes have dispositional tendencies, referred to as competitive orientations, to pursue both self-referent performance based goals and socially referenced outcome goals (Martin, & Gill, 1991). The relevance of this is established by noting that, for distance running, self-efficacy is based on self-relevant goals and outcome expectations are contingent on others, a social comparative situation.

Finally, private self-consciousness should influence outcome expectations and self-efficacy judgments. As Carver (1977) asserts, private self-consciousness should make time and outcome goals salient. Additionally, private self-consciousness should also be related to outcome and self-efficacy expectations because athletes need to think about such private self-related factors as previous performance accomplishments, goal difficulty, psychological readiness, weather conditions, physiological indices of fitness and the competition in order to form these judgments (Jones, Swain, & Cale, 1990). Clearly, the more one attends to and accurately processes these factors, the more accurate the judgments, and the greater the congruence between either self-efficacy or outcome expectations and performance.

Clearly, self-efficacy and outcome expectations, whether influenced by the competitive structure of distance running, situational variables, or dispositional variables, should both predict performance in long distance running for elite runners.

To accurately test self-efficacy and control theory, methodological considerations are important (Maddux et al., 1986). Self-efficacy is strictly defined by Bandura (1977) and does not warrant further attention. In this study the behavior of interest is running and the self-efficacy measure of it is defined by the athlete's time goal and subsequent self-efficacy rating of the goal. Carver defines outcome expectations in such a way that each individual is free to define "outcome expectations" according to their own definition. However, for a valid test of self-efficacy and outcome expectations, the outcome has to be logically tied to the behavior while still allowing freedom for athletes to personally define outcome. Therefore, athletes will define and rate outcome expectancies as they relate to their previously chosen time goal. Finally, because the present study is interested in achievement goals, and behaviors, it is assumed elite runners are primarily achievement oriented. With these considerations in mind the following methodological protocol is stipulated.

CHAPTER III

METHOD

Subjects

Two hundred and sixty eight elite distance runners (144 males and 124 females) were selected from the "Guide to Prize Money Races and Elite Athletes" publication which lists over 550 national and international class road racing athletes from the United States, Europe, and Canada (Stewart, 1991). All athletes with North American mailing addresses were selected because this allowed the self-addressed return envelopes to be stamped with the appropriate USA or Canadian postage. In addition, 50 more runners (33 males and 17 females) were contacted at the conclusion of 5 different road races run in Virginia and North Carolina and asked to participate in the study. These athletes took the packet of materials home to complete and met the same performance criteria as the athletes receiving the study by mail. Contacting these additional athletes was done to ensure an adequate sample size, after a poor return rate was experienced with the mailed questionnaire.

Males and females, under 40 years of age, who had run faster than 30:00 and 34:30 minutes for 10 kilometers respectively, were selected. Six elite master runners (over 40 years of age) listed in the above publication also

participated in the study. Elite masters runners were considered eligible for the study because, similar to younger elite runners, they would have both time and outcome goals upon which to base their self-efficacy and outcome expectations on.

From a total of 318 athletes (177 males and 141 females) the return rate for the complete set of questionnaires was 30% (28% for female respondents and 31% for male respondents) resulting in a total sample of 94 runners (55 males and 39 females). The return rate for athletes receiving the packet by mail was 29% (27% for female runners and 31% for male runners). For runners given the packet in person the return rate was similar at 32% (33% for males and 29% for females).

The low return rate of 30% may have been due to a number of factors. First, as with many mail surveys, subjects may have been unwilling to devote time and energy to completing the questionnaires. Second, subjects received the questionnaires during the late spring and winter and the lapse in time between receiving the materials and their next 10 kilometer race may have contributed to a poor return rate. Third, athletes may have raced infrequently as almost all road and track races occur once a week on the weekends. Last, as several runners reported, they may have been racing consistently but not at the 10 kilometer distance as the study required.

Finally, sixty-three (36 men and 25 women) subjects who

completed questionnaires 1,2, and 3 were not included in the final sample because they had not completed questionnaires 4 and 5 at the time of the data analyses. Some of these athletes may return questionnaires 4 and 5 in the future. A MANOVA examining potential differences between athletes who returned parts 1,2, and 3 and those that completed all the questionnaires was conducted on the variables included in the biographical and private self-consciousness questionnaires. No differences, $F(1,57)=.23$, $p=.92$, were found in age, gender, years of competitive racing, personal best times, or private self-consciousness.

Measures

Self-Efficacy Theory

Self-Efficacy

Each runner was first asked their time goal for their race. They were then asked how certain they were of achieving this goal. Following Bandura's (1977) recommendations they answered a hierarchy of questions asking how certain they were of running within, and faster than, 30, and 60 seconds of their time goal (see Appendix F). The athletes then rated their degree of certainty by circling a number ranging from 0 (not at all certain) to 100 (absolutely certain). A total efficacy score was obtained by adding all the circled numbers together, their self-efficacy strength, and dividing by 5, the number of questions (self-efficacy level).

Control Theory

Outcome Expectancies.

To determine outcome expectancy each athlete was asked (see Appendix F), "What is the most important outcome (i.e., winning or placing in the race, winning prize money, trips or merchandise, making a national team, etc.) that you hope to achieve by running your time goal?" They were then asked to rate how certain they were of achieving this outcome on a 0 to 100 scale with 0 representing not at all certain and 100 representing absolutely certain.

Private Self-Consciousness.

To assess self-awareness subjects completed the Self-Consciousness Scale Revised (SCSR), (see Appendix D) developed by Fenigstein, Scheier, and Buss (1975). Although three subscales assess private self-consciousness, public self-consciousness and social anxiety, only the former scale was used. Fenisgstein et al. have reported a test-retest reliability of .79 for private self-consciousness. Subscale correlations show public self-consciousness is weakly correlated with both private self-consciousness (r=.23 to .26) and social anxiety (r=.20 to .21) while private self-consciousness and social anxiety are not correlated. Fenigsten, Scheier, and Buss (1975) concluded the subscales are reliable and valid. Additional validity work (Carver & Glass, 1976) shows the SCS is not related to IQ, Need for Achievement, Test Anxiety, Activity Level, or Impulsivity Inventories. However, public self-consciousness did weakly

correlate with Sociabilty (r=.22, p<.03) and Emotionality (r=.20, p<.05) and social anxiety correlated with Sociability (r=-.46, p<.0001), Activity Level (r=-.27, p<.007) and IQ (r=-.21, p<.04). The authors concluded that adequate discriminant validity was established. Further work by Turner, Carver, Scheier, and Ickes (1978) examined the relationships among the SCS subscales and potential correlates. Working with six samples comprising 1,395 subjects they found private self-consciousness was lowly to moderately correlated with scales assessing thoughtfulness (r=.48, p<.01), imagery (r=.30, p<.01) and self-monitoring (r=.15, p<.01). Furthermore, none of the subscales correlated with social desirability. In conclusion, the SCS has demonstrated adequate reliability and validity.

Performance

Five measures of performance were obtained. Two measures of performance were the athlete's time and place. A third measure of performance was the difference between the subject's race time and their time goal. The fourth and fifth measures of performance were self-assessments by each runner. Runners were asked "Based on your "time", how well did you perform in this race?" and "Based on the "outcome" you achieved, how well did you perform in this race?". Runners responded on a 10-point likert scale with 1 indicating "I performed poorly" and 10 indicating "I performed very well" (see Appendix G). In order to more fully understand these runners' perceptions, a series of

open-ended questions, based on the investigators' experience as an elite runner, were also asked. After each runner rated their performance based on "time" and "outcome" they were then asked to explain why they answered as they did. Finally, four more questions asked each runner how much they thought about their time goal and outcome goal, and how much they listened to their bodies and used the competition to set and monitor their pace.

Procedures and Design

A packet of materials including a cover letter (Appendix A), describing the study was mailed or given to the athletes. The study was also briefly explained to athletes who received the packet in person. Instructions (Appendix B) in the packet asked subjects to immediately fill out the informed consent form (Appendix C), the biographical questionnaire (Appendix E), and the SCS (Appendix D) and return them in one of the self-addressed stamped envelopes. Subjects were asked to complete the SCS, along with the informed consent form and biographical questionnaires because the SCS represents a stable psychological variable and there was no need to complete these forms at any particular time. In contrast, subjects were instructed to fill out the self-efficacy and outcome expectation questionnaires (Appendix F) the night before their next "competitive" ten kilometer race. Runners were specifically told to "...choose a race where you will be trying to run as fast as you can on that day" and "...do not

fill these forms out for a race that you will be able to coast through and still win," so that all the runners in the study would approach the race with a serious intent to do their best (see Appendix B). Five runners in the study used 8 or 12 kilometer races to complete their questionnaires. Because these distances are close to the 10 kilometer race distance and the 10 kilometer specific self-efficacy scale was still applicable these subjects were included in the study. Completing the self-efficacy and outcome confidence questionnaires before the race was expected to minimize the time between assessing self-efficacy and outcome expectations and the race. According to Bandura (1977) too much time between the assessment of self-efficacy and the behavior of interest can lead to faulty and inaccurate self-efficacy judgments. For example, a sudden overnight increase in tempature may cause a decrease in self-efficacy or an alteration of the time goal upon which self-efficacy is based. Ideally, athletes would make self-efficacy and outcome judgments immediately before the race. However, it was expected that the experienced athletes in this study would be familiar with the competitive field, their abilities and the potential weather conditions the night before the race. At the same time, and most importantly, it was anticipated that asking athletes to complete the self-efficacy and outcome expectations questionnaires the morning before the race would severely limit the return rate.

Finally, immediately after the race, during that day,

the athletes were asked to fill out the performance questionnaire (Appendix G) and return the pre and post-race questionnaires in the second stamped self-addressed envelope provided. Runners were asked to complete these questionnaires immediately after the race so lapses in memory would not hinder the reporting of race experiences.

CHAPTER IV

RESULTS

The results are described in two sections. In the first section, descriptive data on all the variables is presented and this is followed by preliminary analyses examining gender differences and relationships among variables. Second, the results examining the three specific hypotheses are presented.

Descriptive Data

Although no gender differences were predicted, four MANOVAs were conducted on four conceptually similar sets of data to determine if gender differences might affect the hypothesis tests (see table 1). The multivariate Fs for the predictor variables of self-efficacy, outcome expectations and private self-consciousness, $F(1,87)=1.14$, n.s., and the psychological descriptors of time and outcome goal importance, thoughts of time and outcome, and attending to the competition and physiological signs to monitor pace, $F(1,86)=.92$, n.s., were not significant.

The overall Fs for the athlete's descriptive data, $F(1,86)=63.9$, $p<.001$, which included age, years of racing, personal best times, and time goals, and for the performance variables, $F(1,87)=39.5$, $p<.001$, of time, place, self-ratings of time and outcome, and time goal-race time

Table 1

Descriptive Data by Gender

	Male		Female		Univariate	
Variable	Mean	S.D	Mean	S.D	F	p
Age	30.9	5.7	30.0	5.2	.68	ns
Yrs of Racing	13.7	5.3	9.7	4.1	15.9	.001
10K P.B.*	30.04	70.0	34:10	69.0	216.3	.001
PSC**	16.4	5.0	16.1	4.1	.1	ns
Self-Eff	50.5	16.3	54.2	15.4	1.7	ns
Outcome Exp	70.1	19.2	74.9	18.5	1.6	ns
Time Goal Imp	7.5	2.4	7.9	2.3	.3	ns
Out. Goal Imp	8.5	2.2	8.7	1.7	.8	ns
Race Time	30:57	68.0	35:14	72.0	159.0	.001
Race Place	10.5	11.1	5.7	7.3	4.5	.05
P. R. Time	6.2	2.8	7.1	2.7	2.5	ns
P. R. Out	6.8	2.9	7.5	2.7	1.3	ns
Time-Goal Race-Time Diff	-28.0	43.0	-16.0	33.0	1.5	ns
T. of Time	6.4	2.9	7.1	2.8	.9	ns
T. of Out	7.4	2.5	7.4	2.6	.2	ns
Used Body	7.6	2.3	8.5	1.4	4.4	.05
Used Comp	7.3	2.4	6.8	2.6	.6	ns

*P.B.- Personal Best 10 k time; ** - Private Self Con.
P.R.- Performance Rating of; T.- Thoughts of.

difference were significant. Univariate results for the descriptive variables indicate that males had been racing longer, $F(1,86)=15.9$, $p<.001$, had faster personal best times, $F(1,86)=216.3$, $p<.001$, and time goals,

$F(1,86)=187.7$, $p<.001$, than women.

Univariate results of the performance variables indicate that men ran faster than women, $F(1,87)=159.0$, $p<.001$, and did not place as high as women, $F(1,87)=4.5$, $p<.05$. Clearly, with the exception of race experience these differences are most likely related to differences in physiology that allow men to race faster. In conclusion, while it is important to consider gender when doing analyses involving time, there is no support for examining gender in analyses beyond those involving time.

Experience and Ability Indices

These elite adult runners (M=30.5 years) are very experienced as indicated by their years of competitive racing (M=12.0 years) (see Table 2) and by their many notable running accomplishments. For example, examining the single most notable, of many significant, running accomplishments for most of the subjects (n=85) indicates that this sample included a world record holder and an Olympic medalist, world ranked runners (top 10; n=5), Olympic team members (n=8), Olympic trials qualifiers (n=27), national team members (n=23), the winners of major road races (i.e., New York, Boston, and Houston Marathons, etc; n=17) and NCAA champions (n=3).

Another indice of this group's ability are their race times. Personal best times, achieved in the last 2 years, for the 10 kilometer distance ranged from 28:04 to 35:00 (M=30:04) for the men and 31:23 to 38:10 (M=34:10) for the

Table 2

Descriptive Data

Variable	Mean	S.D	Minimum	Maximum	n
Age	30.5	5.5	19	47	92
Yrs of Racing	12.0	5.4	3	28	92
10K P.B.*	31.40	65.0	28:04	38.1	92
PSC*	16.3	4.6	5	26	94
Self-Eff	52.0	16.0	8	94	94
Outcome Exp	72.1	19.2	10	100	94
Time Goal Imp	7.7	2.3	1	10	94
Outcome Goal Importance	8.5	2.0	1	10	94
Race Time	32:38	65.0	28:19	39:10	91
Race Place	8.6	10.0	1	57	91
Perf Rating of Time	6.5	2.8	1	10	94
Perf Rating of Outcome	7.1	2.9	1	10	94
Race Thoughts of Time Goal	6.6	2.9	1	10	91
Race Thoughts of Outcome Goal	7.4	2.6	2	10	91
Used Body	8.0	2.0	1	10	91
Used Comp	7.1	2.5	1	10	91

*P.B.-Personal Best time for 10 kilometer distance
**PSC-Private Self-Consciousness Score

women. Their race times for the races in the study ranged from 28:19 to 34:58 (M=30:57) for the men and 32:20 to 39:10 (M=35:14) for the women.

Psychological Variables

These athletes were only slightly confident of reaching their time goals as indicated by their mean self-efficacy scores (M=52.0%) and moderately confident of reaching their outcome goals (M=72.1%). Surprisingly, a moderate number of runners chose time goals (n=41) that they expressed little confidence in achieving (range=0-49%). Self-efficacy expectations of time were quite variable ranging from 8 to 94% (M=52.0%), which probably reflects these athletes' varying degrees of confidence and the 5 question self-efficacy scale. Recall that the self-efficacy scale consists of a hierarchy of items reflecting increasing difficulty which Bandura recommends for discriminating among various levels of self-efficacy (see Appendix F).

The outcome goals these runners chose are also illustrative of how these runners approach competition (see Table 3). While athletes often have multiple goals, the present study asked runners to only list their most important outcome goal. Many athletes had an outcome goal of making the Olympic Trials in the 10 kilometer race (n=12), placing in the race (n=26), winning money (n=7), placing in the race and winning money (n=15), personal satisfaction (n=4), assessing their fitness (n=11), gaining confidence (n=3), and achieving time goals (n=8).

It was expected that experienced and elite runners would not choose goals that were unrealistic because

Table 3

Outcome Goals

Goals	Females	Male	Totals	Percent
Making the Olympic Trials standard	3	9	12	12.7
Place goals (e.g. top ten)	10	16	26	27.7
Place goals and winning money	6	9	15	16.0
Winning money	4	3	7	7.5
Personal Satisfaction	1	3	4	4.3
Making a national team	0	1	1	1.1
To build confidence	1	2	3	3.2
Fitness appraisal	8	3	11	11.7
Time goals as outcome goals	4	4	8	8.5
Being competitive	1	2	3	3.2
Personal record	0	1	1	1.1
National record	0	1	1	1.1
Winning merchandise	1	1	2	2.1
	39	55	94	99.9

athletes of this caliber are expected to choose realistic and controllable goals (Vealey, 1988). However, these results suggest that elite runners still set and strive for goals that are very difficult, such as making an Olympic qualifying standard, and as a result may have a weak sense of self-efficacy.

For private self-consciousness females ranged from 7 to 26 with a mean of 16.05 and a standard deviation of 4.01 while males ranged from 5 to 25 with a mean of 16.4 and a standard deviation of 5.0. These data are slightly different from previous work reporting means of 15.5 and 17.3 and standard deviations of 4.8 and 4.7, respectively for men and women (Scheier & Carver, 1985). Additionally, Scheier and Carver (1985) reported a gender difference in private self-consciousness whereas this study found no gender difference in PSC.

Finally, there was only one significant relationship among the predictor variables of self-efficacy, outcome self-confidence, and private self-consciousness. Athletes with a strong sense of self-efficacy also tended to be confident in achieving their outcome goals ($r=.21$, $p<.05$). In contrast, neither self-efficacy ($r=.05$) nor outcome expectations ($r=.07$) were related to private self-consciousness.

Performance Variables and Post-Race Assessments

These athletes averaged times of 30:57 (males) and 35:14 (females) minutes for their 10 kilometer races and while 17 runners won their races, 74% finished in the top 10, and as a group they averaged 8.6 for place. Many of them ran races where they were superior to the competition and won, whereas others ran races which featured a number of elite athletes. For example, one athlete ran one of the fastest times in the study (28:19), while competing in a

world class track meet, but finished 14th. Other athletes ran slower (29:30 to 30:30) and won regional 10 kilometer races.

They were satisfied with their performance and generally thought they raced okay based on both time ($\underline{M}$=6.5) and outcome ($\underline{M}$=7.1). In other words, this group of athletes finished their races feeling somewhat pleased with their times and finish places although their race times were usually slower than their time goals. Finally, they almost always used both internal (body signals; $\underline{M}$=8.0) and external (competition; $\underline{M}$=7.1) sources of information to monitor and adjust their race strategy and pace.

Lastly, among the performance variables there are a number of significant correlations (see Table 4). The higher runners placed in their race the more satisfied they were with their performance based on both time ($r=-.43$, $p<.01$) and outcome ($r=-.38$, $p<.01$) and the closer they came to their time goals ($r=-.32$, $p<.01$). Likewise, runners who came closer to their time goals rated their performances based on time ($r=.65$, $p<.01$) and outcome ($r=.51$, $p<.01$) as better than runners who missed their goals by more. Finally, runners who gave their performances favorable ratings based on time also gave favorable ratings to their performances based on outcome ($r=.84$, $p<.001$). Time for men and women was unrelated to the other four measures of performance (see Table 4) suggesting that the faster runners didn't place higher, come closer to their time goals, or

Table 4

Correlations among Performance Variables

	Race Place	Self-Ratings of Outcome	Self-Rating of Time	Time Goal Race Time Difference
Time Male (n=53)	.05	.01	.24	.25
Female (n=38)	.01	.25	.28	.32
Place (n=91)		-.38**	-.43**	-.32**
Rating Outcome (n=94)			.84***	.51**
Rating Time (n-94)				.65**

**p <.01 ***p<.001; @Correlations done with time were done by gender (see Results section).

rate their performances better than slower runners.

Hypotheses Test Results

This study examined three hypotheses based on self-efficacy and control theory. The following sections describe and elaborate on the results of each hypothesis although a more thorough explanation is found in the discussion section. In all results involving time, separate analyses were conducted for females and males because of the expected physiological gender differences which most likely influence race times.

Self-Efficacy and Performance

As self-efficacy theory, and previous research

suggests, the first hypothesis predicted that self-efficacy would be positively associated with performance. This hypothesis received no support. Correlations between self-efficacy and time (males: r=-.04, n=53; females: r=.23, n=38), place (r=.-16), subject's subjective rating of performance based on time (r=.15) and outcome (r=.18), and finally the difference between race time and time goal (r=.02) were all nonsignificant (n=91, see Table 5). Unlike previous research with self-efficacy and running performance (Gayton, Matthews, & Burchstead, 1986; Martin & Gill, 1991; Okwumabua, 1986) self-efficacy was unrelated to performance for these elite distance runners.

Self-efficacy may have been unrelated to performance because runners made faulty self-efficacy judgments (see the Discussion section). Therefore, an exploratory post-hoc analyses was conducted with a sample of runners (n=75) who had race times within one minute of their time goal. Examining this sample of runners allowed the elimination of subjects (n=16) who were considered to have faulty self-efficacy judgments because they missed their time goals by over a minute.

Results of this analyses indicate that self-efficacy was unrelated to place (r=-.15), time goal-race time difference (r=.17) or time for women (n=32, r=.21) or for men (n=40, r=.15). In contrast, self-efficacy was significantly related to self-ratings of time (r=.29, $p<.05$) and self-ratings of outcome (r=.29, $p<.05$). This analyses

Table 5

Correlational Results

Performance Measures (n=91)	Self-Efficacy (n=94)	Accurate Self-Efficacy (n=75)	Outcome Expectations (n=94)
Time@			
-Males (n=53)	-.04	.15	.06
-Females (n=38)	.23	.21	.40*
Place	-.16	-.15	-.20
Time Goal Race Time Difference	.02	.17	.05
Self-Rating of Time Perf	.15	.29*	.11
Self-Rating of Outcome Perf	.18	.29*	.15

*p <.05
@Correlations with time were done by gender (see Results section).

offers minimal support to the idea that self-efficacy may be unrelated to performance because of faulty self-efficacy judgments.

Outcome Self-Confidence and Performance

The second hypothesis, from control theory, predicted that outcome expectations would also be positively related to performance. Similar to self-efficacy, outcome expectations were unrelated to time (men: r=.06; n=53), place (r=.-20), race time-time goal difference (r=.05) or the athletes own ratings of performance based on time (r=.11) and place (r=.15; n=94, see Table 5). Minimal support was found for control theory as outcome expectations

were moderately correlated with time for women ($r=.40$, $p<.01$; $n=38$). Women with higher expectations of achieving a number of varied outcomes (see Table 2) ran faster than women with lower expectations of achieving their outcome goals (see Table 3).

Private Self-Consciousness and Performance

The third hypothesis of this project, also generated from control theory, predicted that private self-consciousness (PSC) would be associated with performance. For subjects with strong outcome expectancies, PSC was predicted to be positively associated with performance, and for subjects with weak outcome expectations PSC was predicted to be negatively associated with performance. Three planned identical sets of analyses, predicted by control theory, with three different samples; based on expectancies, were conducted relating private self-consciousness to the five performance variables. First, a sample of athletes with strong outcome expectations was examined. This analysis was followed by two sets of analyses examining subjects with a weak sense of self-efficacy ($M=38.0\%$) and runners with a strong sense of self-efficacy ($M=63.0\%$). An independent t-test showed that these two groups were significantly different in self-efficacy, $t(90)=8.19$, $p<.001$.

Strong Outcome Expectations

The total sample ($n=89$), less five athletes with weak outcome expectations (<50%), was used to represent a

subsample of athletes with favorable outcome expectations and to determine if PSC was positively related to performance. The five athletes with weak expectancies were excluded because control theory predicts that PSC is negatively associated with performance for these subjects. Generally speaking, PSC was unrelated to performance (see Table 6), although PSC was weakly related to the athlete's subjective rating of their races based on outcome ($r=.22$, $p<.05$). Athletes higher in private self-consciousness rated their performances based on outcomes better than those athletes lower in private self-consciousness.

Weak Self-Efficacy Expectations

A second subsample (n=41) of runners with a weak sense of self-efficacy was examined to determine if PSC was negatively associated with performance for this group (see Table 6). Control theory predicts this relationship for weak outcome expectations, not for self-efficacy. However, because only five subjects had weak outcome expectancies (<50%) this hypothesis could not be tested. As a result, an exploratory examination of this prediction was carried out with runners who had low self-efficacy expectations.

In this low self-efficacy subsample PSC was most strongly related to performance. However, contrary to control theory predictions, PSC was positively, not negatively, related to performance. Although PSC was unrelated to time or place, it was positively associated with runner's own ratings of their performance based on

Table 6

Private Self-Consciousness and Performance

Subsample:	Strong Outcome Expectations (n=89)	Strong Self-Eff (n=51)	Weak Self-Efficacy (n=41)
Performance Measures	Private Self-Consciousness		
Place	-.12	-.11	-.15
Self-Rating of Time Perf.	.18	.07	.34*
Self-Rating of Outcome Performance	.22*	.17	.33*
Race Time Goal Time Difference	.18	.00	.32*

*p < .05
No correlations with time were done by gender because of an insufficient sample size.

time (r=.34, p<.05), and place (r=.33, p<.05) and the difference between subjects race times and their race goals (r=.32, p<.05). Control theory proposes that heightened self-focus towards unfavorable expectancies hinders performance because people exert less effort and perseverance towards achieving unlikely goals. These results suggest the opposite. Runners who tended to focus on their goals and thoughts missed their time goals by less than runners who are less self-focused and they rate their performance based on time and place as better.

Strong Self-Efficacy Expectations

A third subsample (n=51) of athletes with strong self-efficacy expectations was examined to determine if PSC was

positively related to performance (see Table 6). Again, this was an exploratory analysis as control theory makes this prediction for strong outcome expectations, not self-efficacy expectations. No support was found for control theory predictions as PSC was unrelated to athlete's time, place, subjective ratings of time and place, and the difference between runner's time goals and their race times.

Multiple Regression Analyses

The original design of this study also included a series of multiple regression analyses. These analyses were proposed contingent on finding significant relationships between self-efficacy, outcome expectations, and private self-consciousness with performance in order to partition variance. With the exception of outcome self-confidence being correlated with time for women, the above relationships were not found. As a result, stepwise regression equations were not conducted.

CHAPTER V

DISCUSSION

The present study was conducted to compare and contrast three predictors arising from self-efficacy and control theory. It was hypothesized that self-efficacy and outcome expectations, both forms of self-confidence, would predict performance. Furthermore, it was expected that most subjects, being elite runners with histories of running fast and placing high and the freedom to choose their own time and outcome goals, would hold favorable self-efficacy and outcome expectations and that the ability of these judgments to predict performance would be enhanced for runners high in private self-consciousness. This was thought to be the case because subjects high in private self-consciousness direct attention to salient goals upon which their strong self-efficacy and outcome expectations are based. These hypotheses received minimal support.

In particular, self-efficacy was not related to any of the five measures of performance. In other words, self-efficacy expectations of achieving a time goal were unrelated to where athletes placed in their races, the time they ran, their own assessments of their performance, and the difference between their race times and their time goals.

Outcome expectations were only related to one performance measure as outcome expectations for women were related to time ($r=.40$, $p<.05$). Women high in outcome self-confidence ran faster than women low in outcome self-confidence. For men, outcome self-confidence was unrelated to time. Furthermore, for men and women, outcome self-confidence was unrelated to place, self-assessments of performance based on time or outcome, and the difference between race time and time goal.

Finally, private self-consciousness was only related to three of the five performance variables and this was contingent on whether runners had strong or weak expectations. For subjects with strong outcome self-confidence (n=89) PSC was weakly related to their own ratings of performance based on outcome ($r=.22$, $p<.05$). Athletes higher in private self-consciousness thought they ran better, based on outcome, than athletes lower in PSC.

For runners with strong self-efficacy (n=51) PSC was unrelated to any performance variables. Finally, for runners (n=41) with a weak sense of self-efficacy PSC was associated with runners coming closer to their time goals ($r=.32$, $p<.05$) and rating their performance based on time ($r=.33$, $p<.05$) and outcome ($r=.33$, $p<.05$).

The following sections discuss these findings separately and offer possible interpretations and explanations for these results. In the following discussion, recall that analyses done with time were

expected physiological differences. In all other analyses men and women were grouped together because there were no gender differences in the predictor variables of self-efficacy, outcome expectations and PSC, and the non-time performance variables are not heavily influenced by physiological differences as time is. The discussion of the results is followed by noting the limitations of this project and future research directions.

Self-Efficacy and Performance

Because this study sampled elite athletes it was expected that self-efficacy-performance correlations might be suppressed by a restricted range of time/place or self-efficacy scores. It was thought that most runners would run fast times, place near the top in most of their races, and have high self-efficacy scores. These suppositions were only partly true. For time performance the range appears restricted as the men ranged from 675 to 1005 (M=857) and the women from 525 to 790 (M=665). For place performance, the range was large (1 to 57, M=8.6) and there was a large variation in self-efficacy scores (range=8-94%).

The self-efficacy scale was designed to discriminate among highly confident athletes because it assessed strength of self-efficacy at various levels of task difficulty. This measure should discriminate between highly confident and confident athletes and the data seem to support this as self-efficacy scores varied from 8 to 94%. Thus, it would appear that a limited range of self-efficacy scores was not

responsible for the nonsignificant self-efficacy-time relationship. The restricted range of times run may have prevented finding a significant relationship between self-efficacy and time.

Self-efficacy was unrelated to place and neither the range of place scores (1st to 57th) nor the self-efficacy scores (range=8-94%) was restricted. Thus, a lack of a self-efficacy-place relationship would not be due to a restricted range of place or self-efficacy scores. This result suggests that self-efficacy judgments, based on self-referenced time goals, are unrelated to place, a social comparison assessment of performance. This conclusion receives some support as evidenced by the lack of correlation between time and place for both women (r=-.03) and men (r=.08). In other words, if time is unrelated to place then it is reasonable to also expect little or no relationship between self-efficacy judgments, based on time, and race place.

Furthermore, self-efficacy was unrelated to self-ratings of performance based on time or outcome indicating that regardless of how self-efficacious runners may feel about achieving a time or outcome goal these cognitions are unrelated to athlete's assessment of their performance based on time. In short, pre-competition confidence is unrelated to post-competition satisfaction.

This may not be too surprising as self-efficacy is based on varied sources of information such as past

performance, physiological indices of mental and physical readiness, credible and trustworthy persuasion such as a coach's encouragement, and environmental considerations (Bandura, 1977; Jones, Swain, & Cale, 1990). In contrast, open-ended questions examining post-race evaluations of performance based on time and outcome, seem to involve only one type of cognition, as almost all runners explained that they rated their performance based on whether or not they were under or over their time goal and how close they came to achieving their outcome goal. For example, one athlete rated (see Appendix G) both time and outcome performance a 10 because she exceeded her time goal and achieved her outcome goal. In contrast, athletes typically downgraded their self-evaluations if they missed their goals. The more they missed their goals the more poorly they rated their performances.

Finally, the most compelling argument for why self-efficacy was such a poor predictor of performance in this study is probably that these runners made inaccurate or faulty self-efficacy judgments. Bandura (1986) discusses a number of factors that can affect the relationship between self-efficacy and behavior and the following section elaborates on these areas.

Making self-efficacy judgments the night before the race may have allowed too much time between self-efficacy assessment and the race start and this may have allowed new information to cause runners to alter their judgments.

Thus, these judgments may not have accurately represented the athletes true sense of self-efficacy at race time. As Bandura (1986) notes, "the relationship between self-referent thought and action is most accurately represented when they are measured in close temporal proximity." (1986, p 396).

Bandura (1986) cites faulty self-knowledge or misjudgments of self-efficacy as a major reason why self appraisals deviate from action. First, distortions in self-efficacy may occur at the level of perception such as when people misperceive their successes and failures. Second, during cognitive processing people may selectively combine and weigh the various sources of self-efficacy information inaccurately. For example, runners may give too much emphasis to feeling "sluggish" before the race and neglect important information such as previous high level workouts. Finally, distortions in memory of self-efficacy relevant experiences can also occur. Runners, for instance may judge future performance based on superior past performances but neglect more recent and inferior races.

Although the present study was not designed to understand how these runners formulated their self-efficacy judgments the results indicate that almost all runners overestimated their time goals. Most of them ran slower than they had hoped to. While goals are not self-efficacy judgments, self-efficacy judgments are based on people's ability to achieve particular goals (Pervin, 1989; Wood &

Bandura, 1989). It follows that their self-efficacy judgments, based on time goals, would also be inflated. Thus, faulty self-efficacy judgments would be unrelated to performance for runners who have inflated time goals.

This line of reasoning receives weak support when considering the analyses that eliminated runners who missed their time goals by over a minute. This analyses didn't include runners who grossly overestimated their time goals, and who didn't perform up to their expectations. Thus, the most dissatisfied runners in the study were eliminated.

The remaining runners represented a group of athletes who picked somewhat realistic time goals, built accurate self-efficacy judgments around those time goals, came fairly close to those goals, and subsequently rated their performance, based on time and place as satisfactory.

Recall that self-efficacy was unrelated to time, place, or time goal-race time difference and that it was related to self-ratings of time ($r=.29$, $p<.05$) and outcome ($r=.29$, $p<.05$) for this sample and that these relationships were not found using the whole sample ($n=91$). This suggests that runners who have somewhat accurate and realistic time goals and are confident of obtaining them, probably come close to achieving these goals and are then fairly satisfied with the times they run and the outcomes they achieve. In contrast, these two relationships disappear when examining a sample which includes runners who miss their time goals by large margins and are likely dissatisfied with their times and

outcomes.

Outcome Expectations and Performance

In contrast to self-efficacy, there was a limited range of outcome expectation scores as almost all scores (80%) fell between 60 and 100%. Thus, it isn't surprising that the outcome self-confidence and place correlation is non-significant for males. As in the self-efficacy-time/place relationship, a limited range of time and outcome self-confidence scores may have prevented a significant outcome expectation-time relationship for men.

However, for women outcome self-confidence and time were moderately correlated ($r=.40$, $p<.01$) and this is surprising given the restricted range of outcome self-confidence scores. Women with greater outcome self-confidence ran faster than women with less outcome self-confidence. This is somewhat surprising because outcome self-confidence was based on a variety of outcome goals (see Table 3) although many of them were time related. This result does support previous research (Martin & Gill, 1991) which found outcome self-efficacy (a similar measure) was related to both time and place for male high school distance runners. It may be that, similar to the high school sample, elite women are extremely familiar with the competitive field and can make accurate outcome self-confidence judgments when their outcome goals are time and place goals because of their experience and the small fields of elite women they race against.

In contrast, men may have more difficulty making these judgments because they are often racing against a greater number of elite men than women. Some support for this is seen in the mean place finish for men ($\underline{M}$=10.5) versus the mean place finish for women ($\underline{M}$=5.7). Of course another interpretation is that the women in this study were faster, relatively speaking, than the men. However, anecdotal evidence and the author's experience as a distance runner support the notion that in most races the women's field is less competitive than the men's field.

Both men and women based their outcome self-confidence on non-place goals such as Olympic qualifying standards. These are time standards that athletes need to run in order to compete in the Olympic Trials and attempt to make the Olympic team. For women and men most of their outcome goals may be directly, or indirectly, time-related enough that outcome self-confidence is associated with time but only for women because they are more accurate in making these outcome self-confidence judgments.

Finally, as noted in Table 3, both men and women had some outcome expectancies based on subjective goals such as "determining my fitness level", "having a solid effort", and "gaining confidence". For these athletes examining an outcome expectancy and time or place relationship is inappropriate because their outcome self-confidence is not based on a time or place goal but on other, more subjective, goals. Thus, the most relevant test of the outcome

expectancy-performance relationship is to examine the relationship between outcome expectancy and the athlete's own rating of their performance based on outcome. Unfortunately, a limited sample of athletes (n=21) with these types of goals makes this type of analysis difficult to justify.

An examination of these data for the full sample shows no relationship between outcome expectations and self-ratings of performance based on time or outcome. Similar to the lack of a self-efficacy and self-ratings relationship it may be that outcome self-confidence and subjective ratings of performance involve two different types of cognitive processes which are, for the most part, unrelated.

Private Self-Consciousness and Performance

Unlike self-efficacy and outcome expectancies, private self-consciousness (PSC) scores were equitably spread throughout a range of 4 to 26 and this is in line with the previous literature (Carver & Scheier, 1984). Recall that the role of PSC was examined with three different groups. PSC was not related to time or place for any of the groups examined. Thus, the amount of time an athlete spends directing attention inward to their goals, thoughts or motives isn't related to how fast they ran or where they placed in their races, regardless of their levels of self-efficacy or outcome self-confidence. As discussed earlier, detecting a PSC-time relationship may have been difficult with a restricted range of time scores, although this would

not be the case with place scores.

Many studies supporting the role of self-focus in assisting people to more effectively match their behavior to goals or behavioral standards involve tasks with few limitations. For example, learning to solve mazes or simple arithmetic problems have few barriers (Carver & Scheier, 1981a). In contrast, many athletes with high aspirations and goals are often limited by their lack of physical skills and superior competition.

In the present study subjects who were high in PSC may be more aware of their goals and strive harder to achieve them but cannot because of physical limitations. Thus, in tasks where physical factors play a large role, such as in sports, PSC may have a limited, and difficult to detect, relationship to performance. This may be especially true when performance is assessed by outcome variables like time and place that reflect the physical and psychological strengths of the individual and the competition.

In contrast to time and place, runner's self-ratings of performance based on time and outcome are psychological perceptions of physical and psychological performance. An examination of these relationships shows PSC was related to subject's self-ratings of performance, based on both time and outcome, depending on the strength of their expectancies. These correlations, while small, are clearly the most interesting results of this study.

According to control theory private self-consciousness,

a measure of self-focus, is thought to enhance favorable outcome expectations because people high in PSC focus on the goals that they base their strong outcome expectancies on. Thus, focusing on achievable goals should lead to enhanced performance through the often cited benefits of goal setting; increased and directed effort, mobilization of energy, and the development of new strategies (Gould, 1986). This study adds some support to this contention and the following sections reflect these results.

Strong Outcome Self-Confidence Sample

As predicted by control theory, runners high in PSC with strong outcome self-confidence, rated their performances based on outcome as better than subjects lower in PSC, in spite of the fact that PSC was unrelated to time or place. This suggests that runners higher in PSC didn't simply run faster or place higher than runners who were lower in PSC, and subsequently rate their performances, based on outcome, as higher because they ran faster or placed higher.

Thus, although these runners had similar outcome expectations and performed similarly, the athletes higher in PSC rated their performance based on outcome as better than runners lower in PSC. It may be that runners high in private self-consciousness, being "aware" of their thoughts, goals, feelings, may be able to use this information to arrive at more favorable self-evaluations than runners who, being lower in private self-consciousness, have less access

to this information.

Private Self-Consciousness and Self-Efficacy

Although Bandura does not consider the role of self-focus in self-efficacy theory his concept of self-efficacy is similar to outcome self-confidence. Based on the similarities of these constructs exploratory analyses were conducted to determine if control theory predictions based on outcome self-confidence would be applicable to self-efficacy. Thus, subjects were split into two samples based on their self-efficacy scores. Runners with self-efficacy scores greater than 50% comprised a strong self-efficacy (M=63.0%) group and runners with self-efficacy scores of 49% and less formed a weak self-efficacy sample (M=38.0%) and an independent t-test confirmed that these two groups had significantly different self-efficacy scores.

Strong Self-Efficacy Sample

For runners (n=51) with a strong sense of self-efficacy private self-consciousness was unrelated to performance. Thus, athletes who directed more attention inwards to their favorable goals, thoughts and expectations, did not race faster or place higher that runners who directed less attention inwards. Likewise, directing more attention inwards is not related to favorable post-race self-appraisals. This suggests that runners who possess a strong sense of self-efficacy are not aided by directing attention inwards.

Weak Self-Efficacy Sample

Contrary to control theory, subjects high in PSC and with low self-efficacy (n=41) showed a positive relationship between self-focus and three measures of performance. Control theory stipulates that being high in PSC, with weak expectancies causes people to focus on unlikely goals and as a result perform even more poorly than subjects low in PSC because people low in PSC are spending less time focused on unattainable goals and weak expectancies.

These results suggest an additional process. In this study subjects high in PSC and with weak self-efficacy expectations rated their performances based on time and outcome as better than subjects lower in PSC. Additionally, these same athletes missed their time goals by less than runners who were lower in PSC. It is important to note that these are two very different types of measures of "performance." Time goal-race time difference is an objective measure of how close runners came to their pre-race goals whereas post-race assessments of performance are similar to ratings of performance satisfaction. The first measure is a true test of control theory as it is an assessment of matching behavior (race time) to a standard (race goal). In contrast, performance satisfaction is, presumably, matching thoughts and feelings (satisfaction) to a standard (race goal).

Importantly, these same results were not replicated with runners who reported strong self-efficacy expectations

and outcome self-confidence. In other words, these findings supporting PSC and the potential benefits of self-focus only apply to runners with weak self-efficacy.

As control theory suggests, private self-conscious athletes who spend time directing attention inwards may be more "aware" of their goals and subsequently, numerous factors may influence goal attainability. As discussed earlier, it may be that runners high in PSC are able to recognize and account for factors that influence performance and are thus, less self-critical of their performance. For example, being more self-focused may facilitate the "self-serving bias," a phenomenon where athletes attribute success to internal, stable, and controllable factors while attributing failure to external, unstable, and uncontrollable factors and thereby maximizing feelings of confidence and pride while minimizing feelings of shame and disappointment (Gill, 1986; Weiner, 1974). As a result, regardless of the nature of runners expectancies when they started the race, PSC may facilitate favorable post-race evaluations.

Finally, while it may be difficult to ascertain exactly how PSC may be related to self-ratings of performance it is clear that satisfaction with their sport experience is of paramount importance for many athletes. Higher ratings of performance are likely associated with a host of other cognitive, affective, and behavioral variables. For instance, being more satisfied with performance is linked

with enhanced motivation and self-efficacy and subsequent task persistence and adherence.

The second interesting finding from this sample is that runners high in PSC, but with little confidence in achieving their time goals came closer to their time goals than runners who also lacked confidence but were lower in PSC. It may be that awareness of a goal they are unlikely to attain is, for elite runners, motivating. In other words, runners who are aware of the difficulty of their goal are driven to achieve it, not from a strong sense of self-efficacy, but from a fear of failure.

A more feasible explanation is that runners high in private self-consciousness, chose more accurate goals although, ironically, they expressed little confidence in achieving those goals. Nevertheless, as a result their race performance more closely matches their time goal. Support for this line of reasoning is offered by Hollenbeck and Williams (1987) who found the ability of past performance to predict future goal levels was stronger for subjects high in self-focus. In other words, runners high in private self-consciousness may be more "aware" of their performance history and current fitness level and thus set more realistic race goals although it isn't clear why these runners have a weak sense of self-efficacy.

In summary, some limited, but minimal support was offered for control theory. Support consistent with control theory was found by noting subjects higher in PSC, with

strong outcome expectancies, rated performance based on outcome as better than runners lower in PSC. Contrary to control theory, but supportive of the role of self-focus, was the finding that regardless of low self-efficacy expectancies runners higher in PSC came closer to their time goals and rated their races based on time and outcome as better than athletes lower in PSC. It seems that private self-consciousness is associated with performance in two ways. First, in developing pre-race plans runners who are high in PSC seem to be able to set somewhat realistic goals even in the face of low self-efficacy. Secondly, during post-race assessments runners higher in PSC are less self-critical of their performances.

Conclusions

This study examined three hypotheses that are the foundation of self-efficacy and control theory. Five weak to moderate correlations offer limited support for control theory whereas no support for self-efficacy theory was found. First, minimal support was found for control theory as outcome expectancies predicted time for women and second, for men and women with strong outcome expectations, runners higher in private self-consciousness (PSC) rated their performance based on outcome as better than runners lower in PSC.

Results contrary to control theory were also found as the next set of significant findings revealed that runners with low self-efficacy expectations, but high in PSC, missed

their time goals by less and rated their performance, based on time and outcome, as better than runners lower in PSC with equally weak self-efficacy expectations.

Limitations

While some support was found for control theory a number of limitations should be pointed out. This is a self-report study and thus many general limitations of this approach need to be acknowledged. For instance, some subjects may have been prone to social desirability. In personal conversations with some athletes (n=3) it was apparent that they did not want to complete the survey unless it was for a race that they did "well" in. It may be that the investigator's status as a "peer" in competitive distance running influenced some subjects to put their best foot forward. On the other hand, it is likely that the investigator's status as an accomplished runner gave him credibility and thus helped him conduct the study. For example, some runners sought sport psychology advice from him whereas others thanked me for being included in the study.

Because the subjects in this study were elite distance runners spread throughout North America it was necessary to contact them through the mail and there could be something unique about the runners who chose to return the questionnaires versus those who didn't respond. However, for private self-consciousness this group was similar to subjects sampled in other research and there were no

differences between the runners who returned all the questionnaires versus those who only returned parts 1,2, and 3. Nevertheless, the ability to generalize these results to other groups, including other elite distance runners is restricted. Also, it should be noted that these runners were predominately North American caucasians which limits the generalizability of these results.

The present study examines associations between variables and does not establish cause and effect. In other words, although higher levels of PSC may be associated with higher self-ratings of performance we do not know that PSC causes these higher ratings although much of the discussion was centered on a control theory explanation. Additionally, the correlational nature of this study makes it difficult to discuss practical ramifications of these results. However, as control theory suggests, athletes higher in private self-consciousness should have greater insight into their own goals. Such knowledge would be helpful in allowing runners to formulate goals and thus aid the goal setting process.

Finally, one of the goals of the present study was to compare the compatability of self-efficacy and control theory. The limited support gathered for both theories prevented comparing and contrasting them with stepwise regression equations.

Future Research

The concept of self-focus is intuitively appealing. The idea that behaviors, thoughts, and feelings influence

each other to the degree that we "know" or are "aware" of them is supported in a variety of fields (Carver, 1977; Corey, 1990; Powers, 1973). This study is the first to examine private self-consciousness (PSC) in a sport setting and the results are weak to moderate, contradictory, and, difficult to interpret. Nevertheless, there is some evidence that suggests PSC is involved in human functioning as evidenced by the correlations between PSC and self-ratings of performance.

These correlations and the lack of any associations between PSC and time and place suggest the role of PSC may be most prominent when examining it in conjunction with other psychological constructs. In contrast, the physical nature of sport may mask, limit, or even preclude, determining how PSC is involved with athletics. Follow-up research to this study should attempt to resolve the contradiction between the finding that PSC is positively associated with self-ratings of performance for runners with weak self-efficacy and the control theory prediction that there should be a negative association.

The importance of self-focus in the goal setting-performance relationship hasn't been investigated in sport and the relationship between PSC and goal achievement in this study suggests this may be a fruitful area of investigation. In addition, work by Hollenbeck and Williams (1987) supports this line of research by indicating challenging and difficult goals result in better performance

than easier goals, and that this relationship is enhanced for subjects high in self-focus and with important goals.

Furthermore, the rationale for why self-focus is important is that individuals high in PSC spend more time thinking about their goals and have more salient goals. Clearly, this argument suggests self-focus and goal setting research should be done in conjunction to discover how these two variables interact and influence behavior and subsequent cognitions.

Finally, many athletic events, such as long road races are a process whereby goals and expectations likely change over the course of the event. Furthermore, while private self-consciousness is considered a dispositional variable, a variety of situational events can influence immediate state levels of self-focus. The potential for private self-consciousness, and self-confidence based on a variety of important goals, to fluctuate needs to be acknowledged and considered when designing future studies to determine the role of self-focus, expectancies and goals in athletics.

BIBLIOGRAPHY

Abler, R.M., & Fretz, B.R. (1988). Self-efficacy and competence in independent living among oldest old persons. Journal of Gerontology, 43, 138-143.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Reviews, 84, 191-215.

Bandura, A. (1982). Self-efficacy in human agency. American Psychologist, 37, 122-147.

Bandura, A. (1984). Recycling misconceptions of perceived self-efficacy. Cognitive Therapy and Research, 8, 231-255.

Bandura, A. (1986). Social Foundations of Thought and Action: A Social Cognitive Theory. Englewood, N.J: Prentice-Hall.

Bandura, A. (1990). Reflections on nonability determinants of competence. In R.J. Sternberg, & J. Kolligan (Eds.). Competence Considered. New Haven, CT: Yale University Press.

Bandura, A., Adams, N.E., Hardy, A.B., & Howells, S.N. (1980). Tests of the generality of self-efficacy theory. Cognitive Therapy and Research, 4, 39-66.

Bandura, A., Reese, L., & Adams, N.E. (1982). Micro-analysis of differential levels of perceived self-efficacy. Journal of Personality and Social Psychology, 43, 5-21.

Bandura, A, & Wood, R.E. (1989). Effect of perceived controllability and performance standards on self-regulation of complex decision-making. Journal of Personality and Social Psychology, 56, 805-814.

Barling, J., & Abel, M. (1983). Self-efficacy beliefs and tennis performance. Cognitive Therapy and Research, 7, 265-272.

Brody, E.B., Hatfield, B.D., & Spalding, T.W. (1988). Generalization of self-efficacy to a continuum of stressors upon mastery of a high risk sport skill. Journal of Sport and Exercise Psychology, 10, 32-44.

Burgio, K.L., Merluzzi, T.V., & Pryor, J.B. (1986). Effects of performance expectancy and self-focused attention on social interaction. Journal of Personality and Social Psychology, 50, 1216-1221.

Carver, C.S. (1974). Facilitation of physical aggression through objective self-awareness. Journal of Experimental Social Psychology, 10, 365-370.

Carver, C.S. (1979). A Cybernetic model of self-attention processes. Journal of Personality and Social Psychology, 37, 1251-1281.

Carver, C.S., & Glass, D.C. (1976). The self-consciousness scale: A discriminant validity study. Journal of Personality Assessment, 40, 169-172.

Carver, C,S., & Scheier, M.F. (1981a). Attention and Self-Regulation: A Control-Theory Approach to Human Behavior. New York, NY: Springer-Verlag.

Carver, C.S., & Scheier, M.F. (1981b). Self-consciousness and reactence. Journal of Research in Personality, 15, 16-29.

Carver, C.S., & Scheier, M.F. (1984). A control theory approach to human behavior, and implications for problems in self-management. In P.C. Kendall (Ed), Advances in Cognitive Behavioral Research and Therapy, Vol 2, 127-194.

Carver, C.S., & Scheier, M.F. (1987). The blind men and the elephant: Selective examination of the public-private literature gives rise to a faulty perception. Journal of Personality, 55, 525-541.

Carver, C.S., & Scheier, M.F. (1990). Origins and functions of positive and negative affect: A control process view. Psychological Review, 97, 19-35.

Chambliss, C. A., & Murray, E. J. (1979). Efficacy attribution, locus of control, and weight loss. Cognitive Therapy Research, 3, 349-353.

Cheek, J.M., & Briggs, S,R. (1982). Self-consciousness and aspects of identit. Journal of Research in Personality, 16, 401-408.

Colletti, G., Supnick, J.A. & Payne, T.J. (1985). The smoking self-efficacy Qestionnaire: Preliminary scale development and validation. Behavioral Assessment, 7, 249-260.

Corey, G. (1986). Theory and Practice of Counseling and Psychotherapy. Pacific Grove, CA: Brooks/Cole Publishing Co.

Corey, G. (1990). Theory and Practice of Group Counseling. Pacific Grove, CA: Brooks/Cole Publishing Co.

Deeter, T. (1989). Development of a model of achievement behavior for physical activity. Journal of Sport and Exercise Psychology, 11, 1-25.

Desharnais, R., Bouillon, J., & Godin, G. (1986). Self-efficacy and outcome expectations as determinants of exercise adherence. Psychological Reports, 59, 1155-1159.

Duncan, T, & McAuley, E. (1987). Efficacy expectations and perceptions of causality in motor performance. Journal of Sport Psychology, 9, 385-393.

Duval, S., & Wickland, R.A. (1972). A theory of objective self-awareness. New York, NY: Academic Press.

Dzewaltowski, D.A. (1989). Toward a model of exercise motivation. Journal of Sport and Exercise Psychology, 11, 245-269.

Eastman, C., & Marzillier, (1984). Theoretical and methodological difficulties in Bandura's self-efficacy theory. Cognitive Therapy and Research, 8, 213-229.

Eccles (Parsons), J.E., Adler, T.F., Futterman, R., Goff, S.B., Kaczala, C.M., Meece, J.L., & Midgley, C. (1983). Expectancies, values and academic behaviors. In J.T. Spence (Ed.), Achievement and achievement motives Psychological and sociological approaches (pp. 57-146). San Francisco, CA: Freeman & Co.

Eysenck, H.J. (1978). Expectations as causal elements in behavioral change. In S. Rachman (Ed.), Advances in behavior research and therapy. (Vol. 1) (pp 171-176) Oxford: Pergamon.

Ewart, C.K., Stewart, K.L., Gillilan, R.E., & Kelemen, M.H. (1986). Self-efficacy mediates strength gains during circuit weight training in men with coronary artery disease. Medicine and Science in Sports and Exercise, 18, 531-541.

Feltz, D. (1982). Path analysis of the causal elements in Bandùras theory of self-efficacy and an anxiety-based model of avoidance behavior. Journal of Personality and Social Psychology, 42, 764-781.

Feltz, D. (1987). Advancing knowledge in sport psychology: Strategies for expanding our conceptual frameworks. Quest, 39, 243-254.

Feltz, D. (1988a). Self-confidence and sport performance. In K. B. Pandolf (Ed.), Exercise and Sport Science Reviews, 19, 423-457.

Feltz, D. (1988b). Gender differences in the causal elements of self-efficacy on a high avoidance motor task. Journal of Sport and Exercise Psychology, 10, 151-166.

Feltz, D., & Landers, D. M. (1983). Effects of mental practice on motor skill learning an performance: A meta-analysis. Journal of Sport Psychology, 5, 25-57.

Feltz, D. L., & Mugno, D. A. (1983). A replication of the path analysis of the causal elements in Bandura,s theory of self-efficacy and the influence of autonomic perception. Journal of Sport Psychology, 5, 263-277.

Feltz, D.L., Landers, D.M., & Raeder, U. (1979). Enhancing self-efficacy in high-avoidance motor tasks: A comparison of modeling techniques. Journal of Sport Psychology, 1, 112-122.

Feltz, D.L., & Riessinger, C.A. (1990). Effects of in vivo emotive imagery and performance feedback on self-efficacy and muscular endurance. Journal of Sport and Exercise Psychology, 12, 132-143.

Fenigsten, A. (1987). On the nature of public and private self-consciousness. Journal of Personality, 55, 543-554.

Fenigsten, A., Scheier, M.F., & Buss, A. (1975). Public and private self-consciousness: Assessment and theory. Journal of Consulting and Clinical Psychology, 43, 522-527.

Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention, and behavior: An introduction to theory and research. Reading, MA: Addison-Wesley.

Froming, W.J., & Carver, C.S. (1981). Divergent influences of private and public self-consciousness in a compliance paradigm. Journal of Research in Personality, 15, 159-171.

Gayton, W.F., Matthews, G.R., & Burchstead, G.N. (1986). An investigation of the validity of the physical self-efficacy scale in predicting marathon performance. Perception and Motor Skills, 63, 752-754.

Gill, D.L. (1986). Psychological Dynamics in Sport. Champaign, IL: Human Kinetics Publishing, Inc.

Gollwitzer, P.M., & Wicklund, R.A. (1987). Fusing apples and oranges: A rejoinder to Carver & Scheier and to Fenigstein. Journal of Personality, 55, 555-561.

Gould, D.G. (1986). Goal Setting for Peak Performance. In J.M. Williams (Ed.). In Applied Sport Psychology. Palo Alto, CA: Mayfield Publishing Co.

Hackett, G., & Betz, N.E. (1981). A self-efficacy approach to the career development of women. Journal of Vocational Behavior, 18, 326-339.

Harter, S. (1982). Effectance motivation reconsidered: Toward a developmental model. Human Development, 1, 34-64.

Harter, S. (1990). Causes, correlates, and the functional role of global self-worth: A life-span perspective. In R.J. Sternberg, & J. Kolligan (Eds.). Competence Considered. New Haven, CT: Yale University Press.

Hollenbeck, J.R., & Williams, C.R. (1987). Goal importance, self-focus, and the goal-setting process. Journal of Applied Psychology, 72, 204-211.

Jacobs, B., Prentice-Dunn, S., & Rogers, R.W. (1984). Understanding persistence: An interface of control theory and self-efficacy theory. Basic and Applied Social Psychology, 5, 333-347.

Jones, J.G., Swain, A., & Cale, A. (1990). Antecedents of multidimensional competitive state anxiety and self-confidence in elite intercollegiate middle-distance runners. The Sport Psychologist, 4, 107-118.

Kavanaugh, D.J., & Bower, G.H. (1985). Mood and self-efficacy: Impact of joy and sadness on perceived capabilities. Cognitive Therapy and Research, 9, 507-525.

Kazdin, A. E. (1978). Conceptual and assessment issues raised by self-efficacy theory. Advances in behavior research and Therapy, 1, 177-186.

Kent, G., & Gibbons, R. (1987. Self-efficacy and the control of anxious cognitions. Journal of Behavior Therapy and Experimental Psychiatry, 18, 213-233.

Landers, D.M. (1983). Whatever happened to theory testing in sport psychology? Journal of Sport Psychology, 5, 135-151.

Leary, M.R., & Kowalski, R.M. (1990). Impression management: A literature review and two-component model. Psychological Bulletin, 107, 34-47.

Lee, C. (1982). Self-efficacy as a predictor of performance in competitive gymnastics. Journal of Sport Psychology, 4, 405-409.

Lee, C. (1984a). Efficacy expectations and outcome expectations as predictors of performance in a snake handling task. Cognitive Therapy and Research, 8, 509-516.

Lee, C. (1984b). Accuracy of efficacy and outcome predictions in predicting performance in a simulated assertiveness task. Cognitive Therapy and Research, 8, 37-48.

Lee, C. (1989). The relationship between goal setting, self-efficacy, and female field hockey team performance. International Journal of Sport Psychology, 20, 147-161.

Litt, M.D. (1988). Self-efficacy and perceived control: Cognitive mediators of pain tolerance. Journal of Personality and Social Psychology, 54, 149-160.

Maddi, S.R. (1989). Personality Theories; A comparative analyses. Chicago IL; The Dorsey Press.

Maddux, J.E., Norton, L.W., & Stoltenberg, C, D. (1986). Self-efficacy expectancy, outcome expectancy, and outcome value: Relative effects on behavioral intentions. Journal of Personality and Social Psychology, 51, 783-789.

Maddux, J.E., Stanley, M.A. (1986). Self-efficacy theory in contemporary psychology: An overview. Journal of Social and Clinical Psychology, 4, 249-255.

Major, B., Cozzarelli, C., Sciacchitano, A.M., Cooper, M.L., Testa, M., & Mueller, P.M. (1990). Perceived social support, self-efficacy, and adjustment to abortion. Journal of Personality and Social Psychology, 59, 452-463.

Manning, M.M., & Wright, T.L. (1983). Self-efficacy expectancies, outcome expectancies, and the persistence of pain control in childbirth. Journal of Personality and Social Psychology, 45, 421-41.

Martens, R. (1979). About smocks and jocks. Journal of Sport Psychology, 1, 94-99.

Martin, J.J. (1989). The relationships among goal orientation, self-confidence, self-efficacy, anxiety, and performance. Unpublished manuscript.

Martin, J.J., & Gill, D.L. (1991). The relationships among competitive orientation, sport-confidence, self-efficacy, anxiety, and performance. Journal of Sport and Exercise Psychology, 13, 149-159.

Marzillier, J., & Eastman, C. (1984). Continuing problems with self-efficacy theory: A reply to Bandura. Cognitive Therapy and Research, 8, 257-262.

McAuley, E. (1985). Modelling and self-efficacy: A test of Bandura's model. Journal of Sport Psychology, 7, 283-295.

Miller, J,T., & McAuley, (1987). Effects of a goal-setting training program on basketball free-throw self-efficacy and performance. The Sport Psychologist, 1, 103-113.

Morgan, W.P., & Pollock, M.L. (1977). Psychological characterization of the elite distance runner. Annals of the New York Academy of Sciences, 301, 382-403.

Nideffer, R.M. (1976). Test of attentional and interpersonal style. Journal of Personality and Social Psychology, 34, 394-404.

Okwumabua, T.M. (1986). Psychological and physical contributions to marathon performance: An exploratory investigation. Journal of Sport Behavior, 8, 163-171.

O'Leary, A. (1985). Self-efficacy and health. Behavioral Research and Therapy, 23, 437-451.

Orlick, T. (1986). Psyching for Sport. Champaign, Il: Leisure Press.

Osberg, T.M. (1985). Order effects in the administration of personality measures: The case of the self-consciousness scale. Journal of Personality Assessment, 49, 536-540.

Ozer, E.M., & Bandura, A. (1990). Mechanisms governing empowerment effects: A self-efficacy analysis. Journal of Personality and Social Psychology, 58, 472-486.

Pervin, L.A. (1989). Goal concepts: Themes, issues, and questions. In L.A. Pervin (Ed.), Goal Concepts in Personality and Social Psychology. Hillsdale, NJ: Lawrence Erlbaum Associates.

Platt, J.R. (1964). Strong Inference. Science, 146, No. 3642, 347-352.

Poser, E.G. (1978). The self-efficacy concept: Some theoretical, procedural and clinical implications. Advances in Behavior Research and Therapy, 1, 192-202.

Powers, W.T. (1973). Behavior: The Control of Perception. Chicago, IL: Aldine.

Prentice-Dunn, S., & Jacobs, B. (1986). Effects of self-awareness and expectancies on behavioral intentions: Integrating self-efficacy theory and control theory. Psychology Reports, 5, 143-147.

Rachman, S. (1978). Perceived self-efficacy. Advances in behavior research and therapy, 1, 177-186

Sacks, M.H., & Sacks, M.L. (1981). The Psychology of Running. Champaign, IL: Human Kinetics Publishers, Inc.

Sahakian, W. S., (1982). History and Systems of Social Psychology. New York, NY: Hemisphere Publishing Corporation.

Scheier, M.F. (1980). Effects of public and private self-consciousness on the public expression of personal beliefs. Journal of Personality and Social Psychology, 39, 514-521.

Scheier, M.F., & Carver, C.S. (1977). Self-focused attention and the experience of emotion: Attraction, repulsion, elation, and depression. Journal of Personality and Social Psychology, 35, 625-636.

Scheier, M.F., & Carver, C.S. (1981). Cognition, affect, and self-regulation. In M.S. Clark, & S.T. Fiske (Eds.). Affect and Cognition: The seventeenth annual Carnegie Symposium on Cognition. (pp. 157-183). Hillsdale NJ: Lawrence Erlbaum Associates, Publishers.

Scheier, M.F., & Carver, C.S. (1982). Self-consciousness, outcome expectancy, and persistence. Journal of Research in Personality, 16, 409-418.

Scheier, M.F., & Carver, C.S. (1985). The self-consciousness scale: A revised version for use with general populations. Journal of Applied Social Psychology, 15, 687-699.

Scheier, M.F., Carver, C.S., & Gibbons, F.X. (1981). Self-focused attention and reactions to fear. Journal of Research in Personality, 15, 1-15.

Scheier, M.F., Buss, A., & Buss, D.M. (1978). Self-consciousness, self-report of aggressiveness, and aggression. Journal of Research in Personality, 12, 133-140.

Scheier, M., Fenigstein, A., & Buss, A.H. (1974). Self-awareness and physical aggression. Journal of Experimental Social Psychology, 10, 264-273.

Schlenker, B.R. & Weigold, M.F. (1990). Self-consciousness and self-presentation: Being autonomous versus appearing autonomous. Journal of Personality and Social Psychology, 59, 820-828.

Schunk, D. H. (1984). Self-efficacy perspective on achievement behavior. Educational Psychologist, 19, 48-58.

Sechrest, L. (1976). Personality theory and identity advocacy. Personality and Social Psychology Bulletin, 2, 230-233.

Snyder, M. (1987). Public Appearances Private Realities The Psychology of Self-Monitoring. New York NY: W.H. Freeman and Co.

Snyder, M. (1979). Self-monitoring processes. In L. Berkowitz (Ed.), Advances in experimental social psychology. (Vol. 12). New York, NY: Academic Press.

Stewart, P. (1991). Road Race Management: Guide to Prize Money Races and Elite Athletes. Arlington, Va: Road Race Management, Inc.

Teasdale, J.D. (1978). Self-efficacy: Toward a unifying theory of behavioral change? Advances in Behavior Therapy and Research, 1, 211-215.

Tomarelli, M.M., & Schaffer, D.R. (1985). What aspects of self do self-monitors monitor? Bulletin of the Psychonomic Society, 23, 135-138.

Turner, R.G., Carver, C.S., Scheier, M.F., & Ickes, W. (1978). Correlates of self-consciousness. Journal of Personality Assessment, 42, 285-289.

Vealey, R.S. (1986). Conceptualization sport-confidence and competitive orientation: Preliminary investigation and instrument development. Journal of Sport and Exercise Psychology, 8, 221-246.

Vealey, R.S. (1989). Sport personology: A paradigmatic and methodological analysis. Journal of Sport and Exercise Psychology, 11, 216-235.

Wegner, D.M., & Giuliano, T. (1983). On sending artifact in search of artifact: Reply to McDonald, Harris, and Maher. Journal of Personality and Social Psychology, 44, 290-293.

Weiner, B. (1974). Achievement Motivations and Attribution Theory. Morristown, NJ: General Learning Press.

Weiner, B. (1985). An attributional theory of achievement motivation and achievement. Psychological Review, 92, 548-573.

Weiss, M.R., Wiese, D.M., & Klint, K.A. (1989). Head over heels with success: The relationship between self-efficacy and performance in competitive youth gymnastics. Journal of Sport and Exercise Psychology, 11, 444-451.

Wicklund, R.A. (1979). The influence of self-awareness on human behavior. American Scientist, 67, 187-193.

Wicklund, R.A., & Gollwitzer, P.M. (1987). The fallacy of the private-public self-focus distinction. The Journal of Personality, 55, 491-523.

Wiedenfeld, S.A., O'Leary, A., Bandura, A., Brown, S., Levine, S., & Raska, K. (1990). Impact of perceived self-efficacy in coping with stressors on components of the immune system. Journal of Personality and Social Psychology, 59, 1082-1094.

Wood, J.V., Saltzberg, J.A., & Goldsant, L.A. (1990). Does affect induce self-focused attention? Journal of Personality and Social Psychology, 58, 899-908.

Wood, R.E., & Bandura, A. (1989). Impact of conceptions of ability on self-regulatory mechanisms and complex decision-making. Journal of Personality and Social Psychology, 56, 407-415.

Appendix A

Letter of Introduction to the Athletes

Dear _____ Nov 1, 1991

I have been a competitive runner for 8 years. During my career I have participated in a variety of international races including the 1985 and 1987 World Cup Marathon Championships for Canada. I'm particularly interested in the mental factors affecting running performance and how I can help runners improve their "mental toughness". In fact, I became so interested in the mental side of running that I decided to become a specialist in the area. Hence, I'm currently a doctoral student in sport and exercise psychology at the University of North Carolina at Greensboro studying the thoughts, feelings, and performance of elite distance runners.

I'm writing because I need your help. I am interested in learning more about how elite distance runners, like yourself, approach competition. Knowing this type of information will help sport psychology consultants, like myself, find ways to understand and help runners. Because you are an elite distance runner, I'm hoping that you will share your unique experiences and insights into competition by helping me with this project. Only 20 minutes of your time is required to complete some short questionnaires before and after your next competitive 10 kilometer race.

The questionnaires and instructions have been included in this package in the hope that you will assist me. All responses will be confidential and at no time will individual names be used or disclosed. Upon receiving the completed survey I will send you a brief manual on mental skills that can assist you in developing your own competitive psychological skills. In addition, following the completion of the survey and statistical analyses, I will gladly send you a summary of the results.

This study means a great deal to me and should better help us prepare runners in the future. Therefore, I hope that you can find the time to participate. Thanks for your time and patience and I look forward to your response.

Sincerely, Jeff Martin

Appendix B

Instructions to the Athletes

Following this instruction letter you will find 5 short, numbered, and colored questionnaires. Please fill out Questionnaire 1, followed by Questionnaire 2 and 3, at this time (the brown ones) and put them in one of the stamped self-addressed envelopes and mail them to me. Next, during the evening before your next "competitive" 10 kilometer race, complete Questionnaire 4 (the green one). For a "competitive" race you should choose a race where you will be trying to run as fast as you can on that day. In other words, do not fill these forms out for a race that you will be able to "coast" through and still win. Then, following your race, on race day, answer Questionnaire 5 (the yellow one).

Finally, put the remaining Questionnaires in the second stamped, self-addressed envelope, and mail them to me. I anticipate analyzing and writing my findings by next summer and forwarding the results to you at that time. Once again, thank-you for your time and cooperation.

Sincerely, Jeff Martin

Appendix C

Questionnaire 1; Athletes Letter of Consent

I have been informed of the procedures to be used in this project and that I will be required to fill out questionnaires at three different times. These questionnaires will measure attitudes and perceptions towards competition. Two questionnaires (numbers 2 and 3) will be completed following the reading and signing of this form, another (number 4) the night before my next "competitive" 10 kilometer race, and finally the last one (number 5) the day after my race. I understand that all my responses will remain completely confidential.

I also confirm that my participation is entirely voluntary and that I may withdraw my consent and terminate my participation at any time.

I understand that a summary of the results will be made available to me at the completion of the study.

I wish to give my voluntary consent as a participant.

_____

Athlete's signature

_____

Date

Please indicate your name and address here so I will have them readily available to mail you the psychological skills packet and a summary of the results. Thanks.

Name_____

Address _____

_____

_____

_____

Appendix D

Questionnaire 2; Private-Consciousness Scale (PSC)

Please be as honest as you can throughout, and try not to let your responses to one question influence your responses to other questions. There are no right or wrong answers.

1) I'm always trying to figure myself out.

2) I think about myself a lot.

3) I often daydream about myself.

4) I never take a hard look at myself.

5) I generally pay attention to my inner feelings.

6) I'm constantly thinking about my reasons for doing things.

7) I sometimes step back (in my mind) in order to examine myself from a distance.

8) I'm quick to notice changes in my mood.

9) I know the way my mind works when I work through a problem.

Subjects respond on the following scale:

0 = Not at all like me
1 = A little like me
2 = Somewhat like me
3 = A lot like me

Private Self-Consciousness is scored by adding the numbers together for all nine questions (Item 4 is reversed scored).

Appendix E

Questionnaire 3; Athletes Biographical

Female____ Male____

Age _____

Number of years in competitive distance racing_____

Personal Bests (within the last 2 years);

1 mile/ 1500 _____ 5K _____

10K _____ Marathon _____

Most notable running accomplishment _____

_____

_____

When you have finished this questionnaire put questionnaires 1,2, and 3 (the yellow ones) into the first self-addressed stamped envelope and mail them to me.

Appendix F

Questionnaire 4 (to be completed the night before your next "competitive" 10 kilometer race)

Self-efficacy and Outcome Expectation Questionnaires
1) What is your time goal for this race.

Time Goal:_____

Read the following questions carefully. Answer according to how certain you feel with 100% indicating that you are absolutely certain and 0% indicating that you are not at all certain. Circle the number corresponding to how certain you feel for each question.

2) How certain are you of running within 60 seconds of your time goal?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Not at all certain. Absolutely certain.

3) How certain are you of running within 30 seconds of your time goal?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Not at all certain. Absolutely certain.

4) How certain are you of running right at your time goal?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Not at all certain. Absolutely certain.

5) How certain are you of running 30 seconds faster than time goal?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Not at all certain. Absolutely certain.

6) How certain are you of running 60 seconds faster than your time goal?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Not at all certain. Absolutely certain.

7) What outcome (for example, winning the race, winning prize money, trips or merchandise, making a national team, etc.) do you hope to achieve by running your time goal?

Outcome: _____

8) How certain are you of achieving this outcome.

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Not at all certain. Absolutely certain.

When you have completed this questionnaire please put it in the second self-addressed and stamped envelope and do not go back and change your responses later. Thank-you.

Appendix G

Questionnaire 5 (to be completed after your race)

Post-Race Questionnaire

Please write your finishing time and place below.

Time: _____ Place: _____

1) Based on your "time", how well did you perform in the race you just ran. 1 indicates you performed poorly and 10 indicates you performed very well. Circle the correct number.

1 2 3 4 5 6 7 8 9 10

I performed poorly. I performed very well.

2) Why did you rate your performance, based on "time", as you did in question 1?

_____

_____

_____

3) What was the most important "outcome" that you achieved in this race (For example, winning or placing in the race, winning prize money or merchandise, or making a national team, etc.)?

Outcome: _____

4) Based on the "outcome" you achieved, how well did you perform in the race you just ran. 1 indicates you performed poorly and 10 indicates you performed very well. Circle the correct number.

1 2 3 4 5 6 7 8 9 10

I performed poorly. I performed very well.

5) Why did you rate your performance, based on the "outcome" you hoped to achieve, as you did in question 4?

_____

_____

_____

6) How much did you think about your "time" goal during the race? 1 indicates you did not think about it at all and 10 indicates you thought about it a lot. Circle the correct number.

1 2 3 4 5 6 7 8 9 10

Not at all Very much

7) How much did you think about your "outcome" goal during the race? 1 indicates you did not think about it at all and 10 indicates you thought about it a lot. Circle the correct number.

1 2 3 4 5 6 7 8 9 10

Not at all Very much

8) How much did you "listen" to your body to set and monitor your pace? 1 indicates you did not listen to your body at all and 10 indicates you listened to your body a lot.

1 2 3 4 5 6 7 8 9 10

Not at all A lot

9) How much did you use the "competition" to set and moniter your pace? 1 indicates you did not use the competition at all and 10 indicates you used the competition a lot. Circle the correct number.

1 2 3 4 5 6 7 8 9 10

Not at all Very much

10) What was the location, name, and date of the race you ran?

Race Name: _____

Location: _____

Date: _____

11) If there anything more that you would like to add that you feel is important, please do so in this space. If you want to add more please feel free to include extra pages.

Now that you finished the last questionnaire I want to express my sincere gratitude to you for taking then necessary time to do this. Having been in numerous studies myself, I realize projects like this take time and patience. Once again, thank-you. All you need to do now is put this last questionnaire in the remaining self-addressed stamped envelope with the pre-race questionnaire and drop it in the mail to me.

Jeff Martin

Appendix H

Coding procedure for the data:

The following coding procedure explains what each number contained in the raw data represents (see Appendix I).

Variable

Line 1:
Number:
1-3: Athletes I.D. number
5-6: Age
8: Sex (1=male, 2=female)
10-11: Years of competitive distance running
13-16: Personal best
18-19: Private Self-Consciousness
21-24: Time goal
26-28: Self-efficacy
30-32: Outcome self-confidence
34-35: Importance of time goal
37-38: Importance of outcome goal

Line 2:
Number:
1-3: Athletes I.D. number
5-8: Race time
10-11: Race place
13-14: Rating of performance based on time
16-17: Rating of performance based on outcome
19-20: Thought about time goal during race
22-23: Thought about outcome goal during race
25-26: Used body signals to set pace
28-29: Used the competition to set the pace
37-38: Importance of outcome goal

Line 3:
Number:
1-3: Athletes I.D. number
4-6: Time goal confidence

Appendix I

Raw Data

```
001 25 1 10 0960 11 0974 054 080 10 08
001 1005 10 10 10 10 10 08 09
001 080
006 31 1 15 0948 17 0890 066 070 09 10
006 0900 02 09 09 04 09 10 10
006 100
007 27 1 13 0928 15 0908 076 050 10 10
007 0908 14 10 10 08 10 09 10
007 090
008 26 1 13 0975 16 0964 054 070 05 09
008 0924 13 07 07 08 07 04 09
008 070
009                16 0866 078 080 07 10
009 0862 01 10 10 04 09 10 08
009 080
010 27 1 13 0945 16 0890 044 080 05 10
010 0860 07 04 05 08 10 06 09
010 050
011 26 1 10 0935 16 1000 047 085 09 10
011 0998 03 09 10 03 04 08 06
011 050
012 44 1 20 0845 20 0810 036 050 09 05
012 0793 07 07 07 07 03 08 07
012 020
013 35 1 21 0857 13 0907 032 050 10 10
013 0810 30 03 07 10 06 10 06
013 020
017 44 1 28 0900 10 0805 020 050 01 08
017 0823 05 09 09 04 08 09 09
017 000
021 33 1 21 0895 19 0830 044 080 02 10
021 0815 02 05 06 01 10 07 09
021 010
022 31 1 15 0977 13 0971 078 100 07 07
022 0929 17 06 06 08 08 09 05
022 100
024 23 1 09 0798 18 0750 058 050 09 02
024 0746 07 06 08 09 02 07 07
024 060
026 32 1 17 0855 09 0862 036 020 07 08
026 0857 13 08 10 02 10 08 02
026 030
027 29 1 08 0942 19 0850 054 090 07 10
027 0805 02 04 08 07 10 09 10
027 070
028 37 1 24 0825 12 0845 094 070 07 10
028 0825 01 05 05 10 05 09 10
028 080
029 34 1 15 0880 20 0921 054 020 08 04
029 0903 07 08 04 09 07 07 07
029 010
```

```
030 31 1 12 0973 17 0953 050 080 08 09
030 0866 30 01 05 04 05 09 02
030 050
031 27 1 04 1019 05 0994 064 100 10 10
031 0975 21 05 06 10 10 05 07
031 100
032 31 1 09 0921 20 0881 044 050 10 10
032 0872 13 09 09 09 02 10 08
032 010
034 29 1 15 0927 15 0918 072 100 09 08
034 0751 01 07 09 09 05 10 02
034 090
035 27 1 11 0964 25 0895 042 070 08 10
035 0965 02 08 07 08 10 09 05
035 040
039                16 0818 062 090 10 10
039 0826 05 09 07 08 10 08 08
039 080
041 26 1 14 0968 22 0964 054 070 10 10
041 0966 10 10 10 03 03 08 06
041 070
042 30 1 12 0835 24 0857 052 070 10 10
042 0815 05 07 08 09 09 08 01
042 060
043 28 1 15 1020 09 1010 056 080 10 10
043 0958 25 03 01 09 03 09 09
043 080
046 31 1 16 0917 19 0908 042 070 05 08
046 0898 03 08 08 04 06 09 09
046 030
047 36 1 22 0935 24 0964 044 050 07 07
047 0902 15 04 05 06 07 09 07
047 050
050 29 1 12 0986 21 0889 034 090 08 10
050 0870 04 09 09 02 09 09 05
050 010
051 32 1 12 0900 22 0882 040 050 10 08
051 0890 11 09 09 08 04 01 10
051 030
052 27 1 06 0977 17 1017 054 070 08 10
052 1000 09 09 10 03 07 10 08
052 070
053 33 1 15 0890 11 0880 038 090 02 08
053 0824 08 02 02 03 09 02 07
053 060
054 27 1 08 0948 09 0927 066 070 08 10
054 0922 03 08 08 05 08 06 09
054 090
055 37 1 07 0865 09 0842 034 080 06 06
```

```
055 0804 02 03 03 10 09 03 09
055 020
057 25 1 11 0926 25 0921 048 090 07 07
057 0877 07 06 07 02 04 09 10
057 040
058 28 1 20 0829 14 0830 046 060 10 03
058 0802 12 08 09 06 07 09 08
058 040
059 37 1 12 0881 12 0942 044 070 05 09
059 0812 08 01 01 05 10 08 04
059 020
060 28 1 16 0956 18 0917 042 080 09 05
060 0910 08 08 09 09 08 06 09
060 010
061 25 1 08 0904 13 0943 050 080 06 08
061 0854 15 05 01 10 10 10 02
061 070
063 25 1 10 0986 10 0984 040 050 08 09
063 0958 10 04 05 10 06 07 09
063 040
064 41 1 22 0935 06 0854 036 070 04 09
064 0817 02 06 07 02 09 03 09
064 030
065 30 1 16 0860 22 0881 028 070 10 01
065 0835 04 05 07 07 08 08 07
065 000
066 26 1 12 0902 18 0856 064 080 07 08
066          01 01 03 07 08 06
066 060
067 27 1 12 0925 15 0918 046 080 03 09
067 0829 14 02 01 03 08 06 07
067 040
068 47 1 08 0677 19 0640 048 090 08 10
068 0735 05 09 09 08 09 09 09
068 040
069 36 1 20 0816 23 0779 030 090 09 10
069 0765 23 09 09 06 07 09 10
069 000
071 41 1 25 0902 22 0919 043 090 08 10
071 0842 07 05 05 04 02 09 09
071 030
073 31 1 16 0953 16 0868 018 050 03 06
073 0863 04 02 02 02 09 03 06
073 010
075 34 1 19 0917 24 0823 058 090 10 10
075 0801 01 08 10 10 07 10 07
075 070
076 37 1 12 0856 24 0744 094 020
076 0675 02 03 07
076 080
077 23 1 08 0850 16 0798 082 080
077 0793 02 08 10
077 100
```

```
078 26 1 09 0802 14 0830 058 070
078 0803 01 06 09
078 070
080 23 1 08 0919 17 0965 038 050 06 09
080 0945 08 08 06 10 10 09 08
080 040
084 32 1 10 0955 15 0805 036 060 06 10
084 0773 57 03 09 07 09 08 04
084 030
085                16 0990 054 060 10 10
085 0920 38 01 01 08 09 04 08
085 060
200 32 2 10 0646 18 0705 052 080 09 07
200          01 01 02 09
200 070
202 26 2 08 0735 23 0745 064 090 10 10
202 0693 01 10 10 08 07 10 10
202 070
207 30 2 03 0646 24 0673 076 060 10 07
207 0709 27 09 07 08 03 08 07
207 100
209 26 2 10 0796 07 0791 072 080 08 09
209 0720 12 01 01 04 09 06 07
209 090
210 38 2 15 0755 20 0686 060 090 09 09
210 0635 02 01 03 06 03 08 08
210 070
211 31 2 05 0666 16 0613 068 050 10 08
211 0608 04 08 08 08 08 09 07
211 050
213 22 2 06 0696 16 0688 052 080 10 08
213 0645 01 08 10 09 09 09 09
213 050
215 30 2 12 0727 16 0735 054 080 09 10
215 0707 01 06 09 10 10 08 02
215 070
216 29 2 11 0703 20 0562 034 100 02 08
216 0579 01 07 08 05 07 09 07
216 050
218 28 2 06 0715 14 0613 058 100 10 10
218 0588 02 10 10 02 08 10 08
218 090
220 25 2 13 0767 11 0770 060 080 10 09
220 0756 07 08 08 09 08 09 10
220 070
222 26 2 07 0776 14 0630 056 090 07 09
222 0650 01 10 10 08 10 09 07
222 050
230 31 2 07 0733 26 0676 038 100 03 09
230 0757 01 10 10 04 07 10 05
230 010
231 40 2 17 0730 15 0655 056 080 07 09
231 0647 01 07 10 10 10 09 10
231 080
```

```
232 32 2 08 0711 14 0715 062 060 08 08
232 0683 01 09 10 06 07 09 01
232 080
233 34 2 04 0655 11 0673 044 070 10 07
233 0680 08 09 05 09 03 07 04
233 050
234 33 2 14 0653 14 0700 054 070 05 10
234 0680 03 08 09 08 10 10 07
234 090
237 26 2 12 0705 17 0632 042 060 10 10
237 0595 03 05 05 10 10 05 09
237 050
238 36 2 13 0723 17 0660 048 050 03 09
238 0613 05 03 05 08 08 07 05
238 050
239 29 2 04 0757 20 0733 062 090 09 09
239 0737 02 07 09 03 02 06 08
239 080
241 31 2 07 0741 16 0670 052 070 09 09
241 0600 18 01 01 09 02 08 03
241 060
242 32 2 18 0811 16 0793 060 080 08 10
242 0790 01 09 09 10 10 10 02
242 080
243 45 2 13 0689 19 0645 040 080 08 10
243 0620 02 08 10 01 10 10 10
243 030
244 30 2 12 0770 14 0749 044 070 06 10
244 0722 03 07 07 04 09 10 07
244 050
246 36 2 17 0732 22 0673 042 070 05 10
246 0667 09 08 08 03 10 09 08
246 050
248 25 2 12 0562 10 0498 060 030 08 04
248 0525 02 09 08 08 04 09 02
248 050
249 27 2 10 0836 15 0782 036 070 07 10
249 0768 02 08 08 03 10 09 08
249 020
250                16 0694 042 070 10 03
250 0700 04 10 10 10 04 05 10
250 010
251 30 2 08 0736 18 0745 080 090 10 10
251 0736 15 08 08 10 08 09 08
251 090
252 29 2 15       09 0635 048 060 06 10
252 0594 08 05 05 07 07 07 04
252 040
253 19 2 06 0596 14 0617 008 010 04 07
253 0560 27 03 03 08 02 09 03
253 000
256 30 2 07 0608 15 0650 026 050 06 08
256 0573 04 06 06 08 08 08 08
256 020
```

```
257 30 2 08 0798 17 0722 060 080 09 07
257 0705 23 08 08 09 08 07 10
257 070
258 29 2 17 0660 13 0650 056 080 10 10
258          06 06 10 09 10 07
258 080
259 28 2 07 0645 20 0664 090 090 09 10
259 0637 04 08 09 02 09 10 08
259 100
260 30 2 08 0693 13 0675 050 090 08 09
260 0685 04 08 09 09 07 09 06
260 020
262 22 2 07 0650 17 0635 076 090 08 08
262 0640 01 08 09
262 080
263 29 2 06 0691 17 0674 066 090 10 07
263 0696 01 10 10 10 07 08 08
263 090
265 38 2 06 0611 12 0599 066 090 07 10
265 0566 01 08 09 06 09 09 09
265 080
```